SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. XVII.—No. 16. [NEW SERIES.] NEW YORK, OCTOBER 19, 1867. $3 per Annum. [IN ADVANCE.]

OBITUARY.

With great regret we have to announce the death of Elias Howe, Jr., the inventor of the sewing machine. He died on the 3d of October in Brooklyn at the residence of his son-in-law. His personal appearance made him a marked man among those who did not know him by his intrinsic worth. His life is an instance of success under difficulties and a lesson for all who believe in the power of perseverance. He was born in 1819 at Spencer, Mass., the son of a farmer, who also carried on the business of a miller. His youth was spent on the farm, but when still a young man he learned the trade of a machinist. While working at this business in Boston he conceived the idea of a sewing machine. He succeeded in 1845 in producing a working machine, which would cost at least $300, even if manufactured in large quantities. So much opposition was made in this country to his invention that he was compelled to try to find a market in England. He succeeded in disposing of his right for two hundred and fifty pounds, reserving a royalty of three pounds on every machine sold. On his return to this country he found that machines were being made which infringed on his patent and he immediately took means to defend his rights and was driven into litigation to secure his patent from piracy. This occupied years and demanded large sums of money. In the meantime this invention began to pay, and from a few hundreds of dollars a year it rose to at least $175,000 annually. It was not until 1854 that Mr. Howe's claims were acknowledged. Having, ourselves, been employed and consulted by him from the date of his first patent until his final success, we understand thoroughly the painful and arduous labors which in Mr. Howe's case were necessary to his triumph. The merit of his invention and the persistence of his character combined, were the elements of his prosperity. In his death the world has lost a useful mechanic and society a valuable member. We give herewith an engraving of Mr. Howe, which will recall him to the recollection of many.

One trait in Mr. Howe's character should not be unnoticed; his useful patriotism. When the country was in need of soldiers he contributed money largely, and at a public meeting in Bridgeport he enlisted as a private soldier in the 17th Regiment, Conn. Vols., and the writer, then in the office of the Adjutant General, well remembers the stir of supprise among the clerks when Mr. Howe's enlistment papers came in to be filed. He went to the field and performed his duties as an enlisted man. More than this, when the government was pressed for funds to pay its soldiers he advanced the money necessary to pay the regiment of which he was a member.

ELIAS HOWE, JR.

THE BRITISH ASSOCIATION.

REAL IMAGE STEREOSCOPE.

Mr. Maxwell read a paper on a real image stereoscope, with illustrations of solid geometry. In ordinary stereoscopes the observer places his two eyes opposite two lenses, and sees the virtual images of two pictures apparently at the same time. In the real image stereoscope the observer stands about two feet from the instrument, and looks at a frame containing a single large lens. He then sees just in front of the lens, a real and inverted image of each of the two pictures, the union of which forms the appearance of a solid figure in the air between himself and the apparatus.

THE ANEROID BAROMETER.

Dr. Stewart, Superintendent of Kew Observatory, read an interesting paper on the behavior of the aneroid barometer at different pressures. Experiments had lately been made with the view of ascertaining to what extent an aneroid may be considered a reliable instrument when exposed to considerable changes of pressure, such as occur in mountain districts. By means of an air pump the aneroids, when placed in the receiver, might be subjected to any pressure. A method of tapping the aneroids has also been devised, and by this means the experiments as to the deviation of the results given by these instruments were conducted with comparative ease, and with the greatest accuracy. The experiments were still going on.

Sir William Thomson said the aneroid had become so popular an instrument that many had satisfaction in learning that it was capable of giving results with scientific precision. Dr. Stewart had shown that in taking a barometer up a mountain of 12,000 feet the error would only be about 300 feet, and had also shown how to correct this error. By carefully using these instruments, therefore, they had a probability of determining, with much less probability of error, the height of a mountain of 12,000 feet. Among the very important matters which occupied the attention of the British Association, one which might with very great advantage, be followed up, would be the carrying out of experiments on the elasticity of metals, and all solids capable of being experimented upon. He remarked upon the elasticity of metals, and even of rocks, and referred to the time taken by the earth in consolidating—that this had taken place less than a thousand million of years ago. The earth was not, he considered, one-tenth as old as the popular geologists would make it.

MAGNETISM.

Professor Swan read a paper on the phenomena which occur when magnetized steel is dissolved in acids. Dr. Phipson remarked that magnetism, like electricity, distributes itself upon the surface of bodies: and he possessed one or two striking experiments calculated to prove that the amount of surface alone influences the intensity of magnetism in a body.

Sir Wm. Thomson stated that the paper which had just been read contained a very interesting investigation, from the continuation of which they might look for some very important results, but that it was impossible to allow this paper to pass without a protest against the first sentence. Dr. Phipson commenced his paper by saying that it was generally admitted that electricity, like magnetism, generally distributes itself on the surface of bodies, and the only conclusion that could be drawn from this was that it pervades their entire mass. The president did not blame Dr. Phipson for supposing that magnetism resides on the surface, for he had quoted authors of repute. But the truth was that this was just another illustration of the fact that a very large portion of the statements made on natural philosophy were false. In many of the popular books there were statements not merely false in theory, but false as being in direct opposition to facts published many years ago. For example, the question of where magnetism resides was long ago tried, and on examination a false conclusion was arrived at, and which had been proved to be false by a celebrated mathematician. Harlow, long ago, when experimenting on bars of iron, found that the magnetic influence was not discoverable. His experiments were rough, as indeed were all his experiments, and with the rashness which characterized many investigators, he at once stepped to the conclusion that magnetism resides at the surface, and that statement of his had been the fruitful parent of many fallacies.

LUMINOUS METEORS, COMETS, ETC.

Mr. Glaisher, in his report upon luminous meteors, said that the object of the committee was to ascertain more particularly the nature of meteoric flights. Last year there were a vast number of observations. One large meteor was observed at Cardiff, and the luminosity remained visible for about eighteen minutes. One was also seen above Dundee of extraordinary brilliancy, which was ascertained to be about 51 to 57 miles above the earth. A curious detonating fireball was then described. This body was seen in broad daylight in France in the month of June last, and was of a very extraordinary character. Another was seen at Glasgow, which passed nearly over St. Andrews, where it appeared to consist of three parts, each equal to Venus, and it was calculated that this meteor passed at a distance of about 50 miles above the earth. At Aberdeen, a brilliant fire ball was first seen last November, which, it was afterward found was seen also over the whole of Scotland, and as far as Nottingham. A remarkable fire ball, seen near Basle—of which there was a colored diagram on the wall—had been observed in the observatory at Basle and also in Paris.

Professor Alexander Herschel, Glasgow, said that the spectroscope showed a yellow light, but of what this light was composed it was impossible to say. As observers multiplied, however, with telescopes armed with spectroscopes, this difficulty would no doubt be resolved. The connection between comets and meteors had this year been established without doubt, and that connection gave wide scope for speculation as to the origin and character of meteoric bodies. Mr Huggins had made an observation of the light of a comet, and although that observation was not perfect, still it was sufficient to identify the light of the nucleus of the comet with that of the meteoric bodies. There were two theories as to these meteors. Leverrier had shown that their orbit extended from that of Uranus to that of the earth, while an Italian astronomer believed that they came from the utmost fields of space. Fifty-six showers were well established, and it was by the study of these showers that they hoped to continue, and possibly confirm and extend their researches by the assistance of those zealous observers who had hitherto been their supporters and constant assistants.

Professor Herschel said it was too bold to say that every shooting star was a comet. They were more likely the dissipated parts of comets—probably comets torn into shreds by the sun's attraction drawing them into space.

ON THE COLORS OF SOAP BUBBLES.

Sir DAVID BREWSTER.—In repeating the beautiful experiments of Prof. Plateau "On the Equilibrium of a Liquid Mass Without Gravity," the colors of the soap bubble were present to him upon soap films plane, convex, and concave; but the changes of form which they underwent, and their motions upon the film itself, were so incompatible with the common theory of their formation, that he was led by a few experiments to discover their origin and mode of production. The paper proceeded to give an account of experiments which, Sir David remarked, were sufficient to establish the almost incredible truth, that the colors of the soap bubbles are not produced by different thicknesses of the film itself, but by the secretion from it of a new substance flowing over the film expanding under the influence of gravity and molecular forces into colored groups of various shapes, and returning spontantaneously, when not returned forcibly, into the parent films.

Several inquiries were made as to the nature of the soap used, and whether glycerine might not be added with advantage. Sir David Brewster briefly replied to these questions, stating that the experiments could be made by any person in the course of a few minutes, and that all the phenomena described were emitted with ordinary soap bubbles. A mixture of glycerine made the films last much longer.

Sir Wm. Thomson pointed out that the mechanical questions involved in the seemingly simple operation of blowing soap bubbles were the greatest enigmas to scientific men. The extraordinary expansion and adhesion combined in the

vapor spheres were well worthy of the fullest investigation.

ACTION OF LIGHTNING.

In the summer of 1827, a hay stack in the parish of Dun, in this county, was struck with lightning. The stack was on fire, but before much of the hay was consumed the fire was extinguished by the farm servants. Upon examining the hay-stack, a circular passage was observed in the middle of it, as if it had been cut out with a sharp instrument. This circular passage extended to the bottom of the stack, and terminated in a hole in the ground. Captain Thomson, of Montrose, who had a farm in the neighborhood, examined the stack, and found in the hay stack, and in the hole, a substance which he described as resembling lava A portion of this substance was sent by Captain Thompson to Dr. Brewster, of Craig, who forwarded it to Sir D. Brewster with the preceding statement. The substance found in the hole was a mass of silex obviously formed by the fusion of the silex in the hay. It had a highly greenish tinge, and contained burnt portions of the hay. Sir D. Brewster presented the specimen to the museum of St. Andrews.

A NEW ELECTRIC MACHINE FOUNDED ON INDUCTION AND CONVECTION.

By Sir William Thomson.—The principle of the machine (a model of which was exhibited) wasthat of the "Successful Merchant" who commenced life with a capital of ½d., and after a month's persevering industry, realized the handsome sum of £1 and continued to goon increasing his capital at a compound rate of interest. The object of the instrument referred to was not to increase money but electricity, and that increase was at a compound rate. Precisely in conformity to the law which applied to compound interest and the increase of the successful merchant's capital was the increase of electricity by this machine. Given the smallest quantity of electricity, and the instrument increased it at the rate of compound interest, and this increase went on at a perfectly uniform rate. But just as the capitalist finds that he cannot always go on getting higher and higher interest for his money, but must ultimately, perhaps, be content with 4½ per .cent., instead of 5, so was it to some extent the case with this machine. When a very high charge was reached, the increase of the quantity of available electricity was not so great, owing to sparks passing in various parts of the machine, preventing the operator from retaining the full quantity of electricity which was got by it. There was great necessity for an easy-going electric machine, and that now shown fulfilled this condition.

NEW MAGNETIC AND ELECTRIC MACHINE.

By Wm. Ladd.—Two plates of iron, both ends of each plate fixed to a portion of a hollow cylinder; these plates are then placed a certain distance apart, and insulated from each other in such a manner that the cylindrical pieces will form the two hollow circular passages; into these spaces two armatures are placed. The plates are surrounded by a quantity of stout copper wire connected together, the two terminals of which are brought into connection with the commutator of the smaller armature, so that each change of polarity in the armature will augment the magnetism. If the armature in connection with the electro-magnet is made to rotate, there will be a very feeble current generated in it; but this passing round the electro-magnet will increase its power with every additional impulse. The only limit to the power of the machine is the rapidity with which the armature is made to rotate. The great improvement in this invention is the introduction of a second armature. The machine in the Paris Exhibition measures about 24 inches in length, 12 inches in width, and 7 inches high, and Mr. Ladd found that though not perfectly constructed, its power would keep 50 inches of platinum wire .01 in diameter incandescent, and when a small voltameter was placed in circuit with the second armature it would give off 250 cubic centimeters of gas per minute, and in connection with an electric regulator would give a light equal to about 35 Grove's or Bunsen's element, the driving power expended being less than one horse.

USE OF LICHENS AS DYE STUFFS.

Dr. Lindsay said it had been expected that the aniline dyes —a product from the distillation of coal tar—discovered a few years ago, would supersede the lichinous dye stuffs previously in use, in consequence of the breaking up of the Highlands by railways, and the improvement of the communication between Glasgow, Edinburgh, and the south. To him, however, it seemed that all such predictions were at least premature. He had come to conclusions favoring the belief that lichens would not be superseded, at least, for a long time to come. He then proceeded to give numerous details of the use of lichen dyes for commercial and domestic purposes.

Mr. R. Pullar said: It is very important to investigate the question of the value of lichen products, as many more districts might be found where the lichens are produced, and a certain market for them. Orchill or cudbear will not, I think, be replaced by coal tar or aniline colors for many purposes, and especially for rich crimson or claret shades on woollen goods. I think there is every likelihood of this material being used to a greater, instead of less extent, and the introduction of the coal tar colors has rather increased than diminished its use. I do not think the lichen products will ever compete with the coal tar colors for light shades. It is a well-known fact, which can be corroborated by the ladies present, that purples, violets, and other shades produced in former days by the orchill or cudbear, gave way very much sooner than those produced from coal tar. A violet dress or ribbon was formerly stained red so easily by exposure to the atmosphere or the slightest acid, that very few persons thought of having such colors; while, since the introduction of the coal tar shades, however, which, some say, are not so fast as the old colors, there is now an enormous sale, because they can be worn with impunity, and the colors, in most cases, stand well for a long time. This is an extraordinary fact, but can be corroborated by every person of experience.

INFLUENCE OF AIR ON VITAL ACTION.

In this paper Dr. Davy described a certain number of experiments, the result of which showed how much longer some animals are capable of resisting privation of air than others. In one instance an egg, an inchoate animal, so to speak, was hatched, producing a healthy chicken, after having been acted upon by an air pump twenty-six days; a young bird expired in about half a minute, a fish—the minnow—in about half an hour, the frog and toad in about the same time, the earth worm in about an hour and a-half; the insects, such as the dragonfly, butterfly, after the apparent death for more than an hour, recover on exposure to the air, and that repeatedly. By other experiments on birds by means of submersion in water, he showed that different species varied greatly in ability to bear exclusion of air; thus while all the snake birds of which he had made trial expired under water in about a minute or less, the buzzard lived about twenty minutes and a half, the common fowl about four minutes and half, the goose and duck about ten minutes. Reasoning on the results, he infers that each individual animal has something peculiar in its organism determining its peculiarities of function or action, peculiarities more readily described than accounted for. He holds the subject to be in a great measure mysterious, nor is he sanguine, referring to the new and ingenious views on the genesis of species, that they will tend, except partially, to enlighten the subject, considering that life itself is a mystery, and the origination of life, as regards natural science, an unsolved problem.

THE BORING OF LIMESTONE BY ANNELIDS.

By Mr. E. Ray Lankester.—The author stated that, in the discussions concerning the boring of molluscs, no reference had been made to the boring of annelids—indeed they seemed to be quite unknown—and brought forward two cases, one by a worm called Lencodore, the other by a Sabella. Lencodore is very abundant on some shores, where boulders and pebbles may be found wormeaten, and ridled by them. Only stones composed of carbonate of lime are bored by them. On coasts where such stones are rare they are selected, and all others left. The worms are quite soft and armed only with horny bristles. How, then, do they bore? Mr, Lankester maintained that it was by the crabon'c acid and other acid excretions of their bodies aided by the mechanical action of the bristles. The selection of a material soluble in these acids is most noticeable, since the softest chalk and the hardest limestone are bored with the same facility. This can only be by chemical action. If, then, we have a case of chemical boring in these worms, is it not probable that many molluscs are similarly assisted in their excavations? Mr. Lankester did not deny the mechanical action in the pholas and other shells, but maintained that in many cases the co-operation of acid excreta was probable. The truth was to be found in a theory which combined the chemical and mechanical view.

AMERICAN INSTITUTE FAIR.

The exhibition of the American Institute may now be fairly said to have reached its full glory. The confusion so characteristic of the earlier days of the Fair is no longer apparent. The sound of saw and hammer no longer blend with the dulcet tones of the orchestrion, and the musicians have now to contend only with untiring buzz saws, and machinery incessantly and loudly calling for lubrication. The articles have been classified in a catalogue, but implicit reliance placed upon the statements of this important document would be ap to lead the unsophisticated into some serious errors, or convey some ideas respecting their nature and construction entirely at variance with his previous conceptions. A revised edition which is promised before many days will, it is hoped, in some measure remedy this evil.

The most novel and attractive feature of the exhibition is by general consent conceded to be the Pneumatic Railway, erected by Mr. A. E. Beach, of the Scientific American, and every one visiting the Fair seems to consider himself specially called upon to visit, and, after actual experience, to pronounced his verdict upon this mode of traveling. Having accomplished this feat, descending from the mouth of the tube to the main floor, the visitor immediately enters the "Department of Intercommunication," a brief glance at the articles exhibited in which shall be the subject of this notice.

The group most naturally suggested by the title is the telegraph and its kindred applications, and under this grouping, the fine display made by the Bishop Gutta-percha Company first attracts attention. Prominently hung upon the eastern wall of the hall are samples of deep-sea cables, including pieces from cables which have been actually laid in different parts of the world. In a show case is to be seen a specimen of the first submarine cable ever made in which gutta-percha was used as an insulator, being a piece of the identical cable laid across the Hudson River for the Magnetic Telegraph Company in 1848. The conductor consists of a single iron wire of No. 9 gage, insulated with two coatings of gutta-percha, the outer one much oxidized from contact with the air, but the inner coating still perfect. Insulated air-line cables, water pipes, photographic baths, acid pitchers, bottles and vessels in great variety, make up quite an interesting collection. Proceeding on our journey of observation, the telegraphic apparatus of Dr. L. Bradley next deserves attention. In addition to a creditable assortment of relays, keys, etc., the Doctor exhibits a rheostat of superior workmanship, a tangent galvanometer, and other instruments of like character.

A larger and more varied collection of telegraphic instruments fills the show-cases of Tillotson & Co. All the necessary equipments for a well-ordered office are here to be found. A Morse apparatus in full operation at this stand has undoubtedly given to many observers their first insight into the mysteries of telegraphy. On the same table is to be seen Gardiner's machine for lighting illuminating gas by frictional electricity. By its side the electro-medical apparatus of Dr. Jerome Kidder, forms always the center of a crowd of the curious, each anxious to experience the effects of the magneto-electrical shock.

Needham's pneumatic way for transporting packages and mail matter comes next in order. It is claimed that this arrangement possesses marked advantages over the ordinary tube designed for carrying passengers. In the latter the air acts on but one side of the car at once, consequently, it is said, the momentum of one half the air set in motion is lost, but in Needham's model the tube is made continuous, the inclosed column of air being then isolated from the atmosphere, and the whole force is utilized. Classed under the same group, though of a somewhat different character, is Hall's electric switch, so arranged that the continuous ringing of a bell gives evidence of the misplacement of the switch.

Having now introduced the subject of railroads, we pass next to a consideration of the group under which all articles relating to railways are classed.

A locomotive head light of handsome proportions, manufactured by Radley, McAlister & Co., of this city, is prominently posited. The burner of this lantern appears to combine many meritorious points. It is made wholly of brass, its parts being screwed or brazed together so as to be easily removed, repaired and replaced. By the employment of air chambers, the burner is kept perfectly cool, thereby giving a flame of uniform brilliancy and steadiness; a great saving in the evaporation of the oil, and furnishing a sure preventive against the almost universal liability of explosion. A head light manufactured by this firm, we are informed, graces the famous Grant Locomotive, now on exhibition at the Paris Exposition. A handsome head light is also exhibited by Peter Budenbach. The Metropolitan Transit Company show the model of their proposed plan for a three-tier railroad. A contrivance for removing obstructions from, and cleaning the tracks of, street railways, is the invention of John B. Read. The plan is undoubtedly feasible, but we fear that a legal enactment alone would induce the car companies to adopt any plan, however meritorious, for saving life and limbs of their passengers. The subject of bridge building, according to the classification, belongs to this group, but the sole exhibitor seems to be the Moseley Company, who exhibit a model four feet long, which they advertise will support the weight of thirty-five persons weighing one hundred and thirty-five pounds each. They propose to make good the truth of this assertion before the Fair closes. Persons of the proper weight anxious to distinguish themselves, will govern themselves accordingly.

In the group including vehicles and harnesses, the steam carriage for common roads, the invention of P. H. Rocker, of Boston, seems to be the chief attraction. The carriage is an ordinary buggy, with an upright boiler mounted on springs, behind. The cylinders are beneath the carriage body, in front, the pistons acting directly upon the crank serving as the rear axle and which turns the hind wheels. What success the vehicle has met with, we were not able to ascertain, no person seeming to have charge of it, and, as was the case in innumerable other instances, inventive imagination must supply, in great measure, the place of reliable information. Near the steam carriage, the arrangement of C. Ducreux, for instantaneously detaching horses from carriages, is illustrated by a working model. The object to be attained cannot be too highly commended, and providing some means for easily releasing running horses from vehicles, should be enforced by law, if in no other way it can be brought about. In this arrangement a lever under control of the driver loosens the trace and other connections, and instantly frees the horses. Colburn's method of effecting the same result is quite simple and equally valuable for the readiness with which the horse may be attached or detached from the carriage. A spring bolt on the harness saddle fits into a socket on the shafts; this is the only attachment, tugs, traces, whiffletrees, and breeching being entirely dispensed with. Should the horse run away with the carriage, or, slipping on a treacherous pavement, fall down, the driver pulls a cord connected with the spring bolt, when the animal is instantly detached. Mr. John Raddin, of Lynn, Mass., the exhibitor of this latter contrivance, presents to the public an elastic carriage wheel which is bound to make glad the heart of every member of the riding community who has ever occasion to ride over the cobble stone style of street pavement. The wheel is rendered elastic, so as to relieve the jar and rattle in striking against, or passing over, stones or inequalities, by applying to the end of the spokes a packing of india-rubber in a box or socket fitted to the felly. By this arrangement such riding, if we are to receive the assurances of the inventor, is rendered an absolute pleasure, the degree of the enjoyment being, we suppose, proportionate to the amount of jolting experienced. An elastic car wheel of the same inventor has between the hub and web, a ring of rubber pressed in by bolts and flange, to take the load and jar. The hub being separate from the web, it can be replaced when required with small expense. Turning again to carriage wheels, we willingly make a note of Stuart's metallic hub, whose peculiarity consists in dovetailing each spoke separately inside the hub, so that, while they can never get loose or work, they may be easily removed and new ones inserted without removing the tire.

In the group of which vessels are the characteristic type, we notice first an application by Mr. Montgomery of his corrugated iron to the construction of ships' ribs. Near by is a tank in which swims one of Golding's combined mattress

and life-saving raft. Each mattress has a buoyancy sufficient to support one person in case of necessity, and is provided with compartments for holding water and provisions. By means of hooks, any number can be fastened together so as to make a raft of any required size. Of that almost endless variety of devices for boat detaching, brought forward consequent upon an act of Congress in July, two years since, making it incumbent upon all vessels to carry such apparatus, we find but three on exhibition, of which the pioneer in this class, Brown & Level's, is manifestly the best. The bronze medal awarded for this tackle at the Paris Exposition is placed in a prominent position.

The Union power capstan claims for itself superiority over all others, working forward and backward as a simple capstan, and with a purchase of four and one-half to one, also forward and backward. It can be taken apart on shipboard with no other tool than its own parts supply. Spaulding & Coffin, of Boston, are the exhibitors.

The fifth group is devoted to implements and materials used in printing and engraving. Messrs. Hoe & Co. take the lead in this line, exhibiting sets of printers' materials, and a variety of forms of copying and embossing presses. The Novelty printing press is a Boston notion, and is designed to furnish a cheap, simple, job printing press for business men to amuse themselves with during leisure moments, and for a merely nominal sum furnishing the source for a rare combination of convenience, pleasure and profit. The bed of the press is stationary and nearly vertical, and against it the platen is brought by the power of a toggle joint with treadle attachment.

In group No. 6, is placed the differential pulley of T. A. Weston, of Buffalo, N. Y., and Doyle's Empire power tackle, the latter apparatus being the especial favorite of the youthful visitors, who, apparently, firmly believe that its sole purpose is the early development of the juvenile muscle. Without attempting to explain the course of reasoning of the committee in assigning burglar-proof safes to the "department of intercommunication" especially, as is the case with those now on exhibition, when said safes are securely locked, we would speak very favorably of the external appearance of the bankers' safes of Terwilliger & Co. We confess ourselves also unable to explain exactly in what way steel cannon fall under the same classification, unless considered as a means of intercommunication, in which case we would in conclusion draw attention to the model made by Thos. Prosser & Son, of an eight inch cast-steel breech-loading rifled cannon.

THE PNEUMATIC RAILWAY.

It is an interesting sight to stand at the mouth of the great tube and observe the arrival and departure of the car with its loads of passengers. The car fits the tube like a piston and travels both ways with the utmost regularity and steadiness. Nothing can be more gentle and pleasant than the start and stoppage; no jerking or wrenching of any kind is observable, and although the car is not provided with springs it rides along very easily. The tube is 107 feet in length, 6 feet in diameter, and is composed of fifteen layers of veneers, laid and cemented in alternate spirals, forming a total thickness of an inch and a quarter. This peculiar construction gives great strength and rigidity. The car carries twelve passengers, and its body is rounded on the same curve as the tube. Indeed, the body was made of a section of the tube cut in halves and the ends united forming a long open cradle without roof, with seats on each side, presenting the appearance of an omnibus sleigh. The wheels project three inches through the shell of the body, turn in boxes arranged under the seats, and run on a small track laid through the tube. One end of the car is provided with a disk or head which fits the tube and forms a traveling piston. There is a door in the disk, also ventilating valves; the lights and water gages are also arranged upon the disk. The disk presents a superficial area of 28 feet against which the atmospheric pressure acts to propel the car.

The Æolor or blowing wheel is made in the form of a screw propeller. It is 10 feet in diameter, made of wood, has eight blades, and revolves at the mouth of the tube opposite to that at which the car enters. When the screw turns in one direction it sucks the air through the tube and the car is drawn in. The car, as it passes along, moves a lever which gives a signal and by the time the car arrives near the screw the latter is reversed which forces a blast of air into the tube and drives the car back. The Æolor is capable of producing a far greater pressure than can be safely used upon the car in so short a length of tube.

There are two of the Æolors at the Exhibition. One of them works the Pneumatic Railway, the other, of smaller size, the Postal Pneumatic Dispatch. Both are driven by one of Root's little trunk engines, diminutive in size but exceedingly compact, runs beautifully, and gives out abundant power.

The visitors at the Exhibition manifest a lively interest in the Pneumatic Railway, and all seek for the ride. To be carried along by the air pressure is an entirely new sensation. More than twenty-five thousand persons have already been safely carried, much to their enjoyment and satisfaction. Mr. John D. Gilbert is the conductor and accompanies every train. It is probable that a Pneumatic Railway of considerable length for regular traffic will soon be laid down near New York under the auspices of the Pneumatic Dispatch Company of New Jersey, of which Mr. Beach has lately been elected President. Great credit is due to the Holske Machine Company who were the builders of the Pneumatic Railway and the Pneumatic Postal Dispatch as presented at the Exhibition. The whole work, tubes, cars, blowing screws and all, were constructed by them in the short space of six weeks. Considering that every thing was of a novel and experimental character, this was making good time. The work was conducted under the immediate personal superintendence of Mr. W. F. Holske, who is one of our most reliable, experienced and energetic mechanical constructors. It has been his business for many years to build experimental machinery. He is quick to appreciate a new idea, and prompt in putting it into bodily form. Many of the best patent models that come to our office are from the establishment of the Holske Machine Company, 528 Water street, New York city. We shall give a description of the Postal Pneumatic Dispatch in our next.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Artesian Wells.

MESSRS. EDITORS:—The ascension of water in Artesian wells is not very satisfactorily accounted for, and the cases reported by your Chicago correspondent, on page 163, current volume, is an unique instance.

From a depth of more than 700 feet, and rising more than 80 feet above any surrounding source of production and higher than any land of that elevation within a hundred miles or more, as is the case, is an anomaly in hydro-dynamics

The prevailing *rationale* of the subject has generally been this: High sources in elevated land, with dipping stratified rocks, which being tapped by boring, forming the inverted syphon, the water must inevitably rise to the level of its source; but this contingency does not prevail at Chicago, nor in hundreds of other localities where water is always found, if the borings are continued deep enough in quite or entire horizontal rocks, the syndinal or antidinal pitch of the strata are never consulted or required. This theory is hardly a rational explanation of the results.

Another explanation is, that as all the sedimentary and even the primitive rocks are the result of crystalization or deposit from water, the hardening and shrinking of the strata leaves interstices and cavities filled with water which, when tapped, the superincumbent pressure forces it up and it follows the law governing fluids in like cases. But in this case it would be fair to presume that the source in time would become exhausted, like the oil wells of Pennsylvania.

Another, and to my mind the most rational one is, that as it is universally admitted that the center of the globe is in an incandescent or even fluid state, its great heat must produce from the lower portions of the 40,000 feet of the sedimentary rocks, steam, which penetrating the pores, fissures, and laminated portions, arrives at the condensing point under great pressure, which, on being relieved by boring, would in all cases produce a constant and unchangable flow.

Mr. Schufeldt's question in hydraulics is an abstruse and difficult subject for elucidation. Let us suppose that the source of supply is not a great basin or reservoir which the boring has penetrated, but a region of rock containing lamina and porosity, where the water by force has remained in a quiescent state for all time; on being relieved from its imprisonment by boring, it is produced from all quarters by flowing and segregation. On rising to nearly a balance of power, the antagonistic principles of weight and upward pressure are slowly adjusted and take time to assert their rights.

On turning the stop cock at the surface, there is no accumulation of water or head, there is no absolute space to contain it, and it is simply locked in a quiet state as it was before its release, and consequently when nearly on an equilibrium of forces, must necessarily rise very slowly.

I regret that Mr. S. did not report the temperature of the water, as well as that of the springs or wells, that we might compare the results with other locations, as to its increase according to depth. I should expect it to be about 70° Fah., well water being 55°. L.

Rochester, N. Y.

[Several other communications on the same subject account for the phenomenon on the principle of the inverted syphon, well understood by students of natural philosophy. One from the Pensylvania oil region gives an account of similar performances. The presence of carbonic acid gas in subterranean caverns communicating with the well hole, is suggested by one correspondent as a possible explanation of the Chicago well performance; but we do not understand that theory as sufficient to satisfy all who make physics a study. The reason for the intermittent, almost capricious action of the Chicago well is probably yet to be ascertained. Its exhibition is by no means new. For years travelers have known of similar wells—natural—in the Tyrol, and in Sweden such phenomena in wells dug for domestic purposes are not rare.—EDS.

The Comets Again.

MESSRS. EDITORS.—In No. 13, current volume of the SCIENTIFIC AMERICAN, Mr. P. G. Yendell has endeavored to refute the theory advanced by me in No. 10, current volume of your paper, namely, "that the tails of comets are refracted light." Mr. Yendell has evidently not seen Dr. Ramsay's article in No. 6, current volume of the SCIENTIFIC AMERICAN, in which that gentleman advances the theory that the tails of comets consist of reflected light. My communication is merely a modification of Dr. Ramsay's theory. If Mr. Yendell will read Dr. Ramsay's very interesting paper, he will get a very good explanation how it is that although light moves in straight lines the tails of comets appear curved. Mr. Yendell says "that he cannot resist the conviction that the tails of comets are composed of nebulous matter as evidently left behind by the motion of its head as the smoke of a locomotive by the progress of a train."

According to this theory the tail of a comet would follow precisely in the path or orbit of the same and would spread to the rear even when receding from the sun which your correspondent perhaps by experience knows it does not. If the appendage of a comet was nebulous matter left behind from the nucleus, like smoke, the nucleus would soon be dissolved and would disappear entirely unless it could be explained where it got the material from to feed and keep up the nebulous tail.

Before advancing a new theory it should have been proved that the old existing theory was not correct. The question to settle now is "is it possible and in harmony with the known laws that govern the universe that the tails of comets consist of nebulous, ponderable matter?" To me it appears impossible and entirely against the law of gravitation that a nebulous appendage could be formed many millions of miles in length, apparently much rarer than the body of the comet; it seems to me as impossible, as it is, that the atmosphere surrounding the earth could form an appendage and follow in the orbit of the same.

My supposition is that comets are worlds of a more recent formation than the other planets of the solar system; they are going through the process of development and are perhaps in a liquid and vaporous condition holding in solution all the elements to form a crust as on the planets. As long as this crust is not formed the body of the comet is not opaque, the rays of the sun can pass through it and are refracted, and in this way the tail is formed. AUGUST WILHELM.

Philadelphia, Pa.

The Rotary Force Centrifugal.

MESSRS. EDITORS:—You have been coquetting for some time in your journal with the essence of matter, the centrifugal force, and with Helwolt'z's theory of vortex motion by calorical force.

This theory is opposed by an old discovery—neither heat nor electricity, when set free, are motive forces. They pass through bodies, disturbing the molecules, and leave them as before.

Your other questions, the essence of matter and the centrifugal force, are subjects of deep interest, and will be better understood if we state first what are the real discoveries that are made, and what is yet conjectural in the science of motion. At present there is no genius, no scholarship, no proofs that will satisfy the public mind, until it is guided out of the dark problem of Sir Isaac Newton's theory of attraction of gravitation. His great discoveries that have awed public opinion into submission to his views, were made from his observation of the phenomena of motion, and not on his problem of attraction. His problem itself is centripetal, and if it proves any thing clearly, it brings all bodies in motion to a state of rest.

It so completely ignored the centrifugal force, that for generations it has been unrecognized by science. Witness recent calculations of how long before the earth will fall down upon the sun. Now, if I at all understand the hidden power in the rotary force, which the attraction of gravitation fails to account for, it discloses more than is yet known of motion, by the aid of Sir Isaac Newton's discoveries. By comparing the phenomena of motion, which the attraction of gravitation fails to explain, with the phenomena of motion which it does account for, we shall gain the share which the rotary force controls in the movement of bodies in space.

And first, gravitation explains why the planets, comets, and sattelites, revolve in elliptical orbits, or curves, consisting of circles, ellipses, parabolas, etc. Secondly, it explains the unequal velocities of these bodies, in their orbital movements, together with the perturbations common in the movement of the planets.

Sir Isaac Newton says all these phenomena are susceptible of explanation and computation by his theory of universal gravitation; and here the domain of the law stops.

It fails absolutely to account for the force which revolves the planets on their axes; it does not explain why the planets and sattelites revolve in orbits so nearly circular; it does not answer the significant question, why the planets revolve around the sun in the same direction. Gravitation would have accounted for this motion if the planets had circled around the sun in opposite directions.

All these questions therefore remain for the rotary force to explain. Moreover, gravitation gives no reply to the question why the planes of the planetary orbits are so nearly coincident, or why the planets all rotate on their axes, in the same direction in which they revolve in their orbits, or why the sattelites obey the same rule, and the sun itself in like manner rotates on its axis in the general direction of the motion of its attendant sattelites.

From what is conceded to Sir Isaac Newton's theory of the attraction of gravitation, and what it fails to account for, we may see how much is concealed from us in the hidden power of the centrifugal, and its resultant rotary force.

Rhinebeck, July 23, 1867. F. V. M. D.

Pumping Hot Water for Boilers.

MESSRS. EDITORS.—My attention has been attracted to a paragraph in the SCIENTIFIC AMERICAN from your correspondent, on the subject of pumping hot water and your observations thereon, because it is one of much importance in regard to the safe working of steam engines, etc. It might be considered a matter of course, by many, that if a force-pump of given dimensions will inject a certain volume of cold water into a boiler within a stated period and continue to do so uniformly, that the same pump will inject a like quantity of hot water in the same length of time.

I am of opinion that somewhere about here lies the key to the solution of so many mishaps in the bursting of steam boilers, and that the explosions generally arise from the want of a sufficient supply of water by the force pump. My theory is that a force-pump for water of a high temperature ought to have twice the capacity of that used to pump cold water

when the volumes to be pumped are alike, because it is a fact that although water does not boil in an open vessel under 212 degrees, it is quite otherwise in a vacuum or a partial one. Hence, it does appear that in the case of hot water, the moment that the plunger forms the vacuum, just then, the hot water being relieved from pressure, forms into steam more or less and partially fills the pump chamber and thus prevents the regular passage of water through the valve. I therefore conclude that if the water to be injected is of a high and varying temperature its regular flow is not to be depended upon unless the pump be made sufficiently large to contain both water and steam in quantity at the same time, owing to its sudden transition from water, in the supply pipe, to steam, in the vacuum chamber of the pump.

Owen Redmond.

Rochester, N. Y.

Volumetric Estimation of Barium.

Messrs. Editors:—All the metals of the third and fourth groups must first be removed by means of suitable reagents, either sulphide of ammonium or sulphureted hydrogen. Acetate of soda is then added in sufficient quantity to displace the acid present, by acetic acid. Heat about thirty-five grammes of bichromate of potassa in an oil bath until all the water of crystallization is thus expelled. As soon as cool weigh out 21.518 grammes of it, and dissolve in one liter of distilled water, then each cubic centimeter of this solution will precipitate .01 gramme of barium, as may be seen by the following proportion:—Ba; Ko, 2 C O_3 :: 10 : x; or, 685 : 147.4 :: 10 : x .·. x=21,518; .·. since a liter precipitates 10 grammes, one cubic centimeter precipitates .01 gramme. A burette holding 100 cubic centimeters is then filled with the standard solution and placed in a burette stand over the barium solution. The standard solution is then allowed to run into the beaker until no precipitate is formed after the precipitate has subsided, in the supenvatant liquid on the addition of a drop of test solution. This point can be determined more exactly by putting a drop of nitrate of silver upon a glass plate and adding to it a drop of the solution; if a crimson precipitate is produced it is necessary to add more liquid from the burette; this is repeated very cautiously until there is no longer any reddish tinge produced in the nitrate of silver. The number of cubic centimeters is then read off, and the amount of barium in the original solution found a simple calculation; as for example, suppose that 78.9 cubic centimeters have been used, then the amount of barium present would equal 78.9÷1000×10=.789 grammes.

G. H. Mann.

Troy, N. Y.

The Sun's Diameter.

Messrs. Editors:—I find in the Scientific American, page 179 of the present volume, that the sun's true distance is ascertained to be 92,340,,000 miles. If this be correct, the sun's mean horizontal parallax is 8.85″, and not 8.5776″, as was settled upon by the council at London some years ago. Now, taking 92,340,000 miles as the mean distance of the sun, either the apparent semi-diameter is more than 16′, as is generally given, or the real diameter is less than 886,000 miles, and which is it?

A. J. Harris.

Wanseon, Ohio.

Ammoniacal Gas as a Motive Power.

The idea of using ammoniacal gas as a motive power in place of steam has been entertained by many inventors, but has never before, we believe, been successfully carried out. A few years ago, MM. Tellier and Flandrin proposed to propel omnibuses through the streets of Paris by its means. They started, or proposed to start, with a vessel of the liquified gas, and supposed that when this was opened, by turning a tap, the gas would be discharged into a cylinder with sufficient force to drive forward a piston; and water being then admitted to the cylinder, the gas would be condensed, and a vacuum formed, and the piston driven back by atmospheric pressure. Our readers will thus see that the principle of an ammonia engine is pretty much the same as that of Newcomen's steam engine. The plan, if at all feasible, is obviously better suited for stationary than locomotive machinery, and the most reasonable application of ammonia has been made by M. Fromont, who proposes to work a pump by its agency. His engine differs somewhat from that of M. Tellier, inasmuch as he drives the piston in both directions with the gas.

A recent visit to the Paris Exposition has shown us an engine of his actually at work—or, rather, in action, for it was not usefully employed—and driven by a mixture of steam and ammoniacal gas. Strong liquid ammonia is used in the boiler, and the vapor generated is said to be a mixture of at least 80 parts of ammoniacal gas and 20 parts of steam, so it may be fairly called an ammoniacal engine. The principal recommendations of ammonia when applied as a motive power consist in the small amount of fuel required, and the short time it takes to get up the steam, so to speak. The economy in fuel is very considerable, being about one fourth of that required to generate steam alone. As regards the boiler, it may be of either of the ordinary forms, the only complete novelty being the apparatus for condensing the steam and ammonia. The gas disengaged (about six atmospheres at 110° Cent., with an ordinary solution of ammonia) does its work in the cylinder and then escapes into the tubes of a condenser, where the steam is condensed and the gas is cooled. The gas then meets with water from an injector which dissolves it, and the solution is carried on into a vessel called the "dissolver," from which it is pumped back into the boiler to do its work over again. The water for the injector is taken from the boiler, and is cooled before meeting with the ammoniacal gas by passing through a worm surrounded with cold water. These arrangements are necessarily a little complicated, and could not be fully understood without drawings. It is, however, satisfactory to see that an ammonia engine is a possibility, and thus power is obtainable where fuel and water are both scarce.—*Mechanics' Magazine.*

Ober's Patent Toilet Glass.

Not ladies only, but gentlemen frequently feel the want of a convenient mirror by which a view of the back of the head can be obtained when dressing the hair, the common hand glass being inconvenient and requiring one hand to hold it. The device seen in the engraving is convenient and elegant. It is a box designed for holding brushes, combs, and the other paraphernalia of the toilet, having attached a mirror of convenient size and a hinged frame that, when elevated, sustains at its end a smaller glass, which, with the back of the head is reflected in the larger mirror. The jointed frame will permit the adjustment of the small mirror at any angle desired,

and will fold upon itself and on the box, making the whole contrivance, when not in use, portable and convenient. The jointed frame and small mirror may be attached to any ordinary mirror frame. In the form represented in the engraving it is especially adapted to the requirements of travelers, and in any form it is useful in all places.

It was patented through the Scientific American Patent Agency June 25, 1867, by Albert Ober. Further information may be obtained by addressing Ober Brothers, Beverly, Mass.

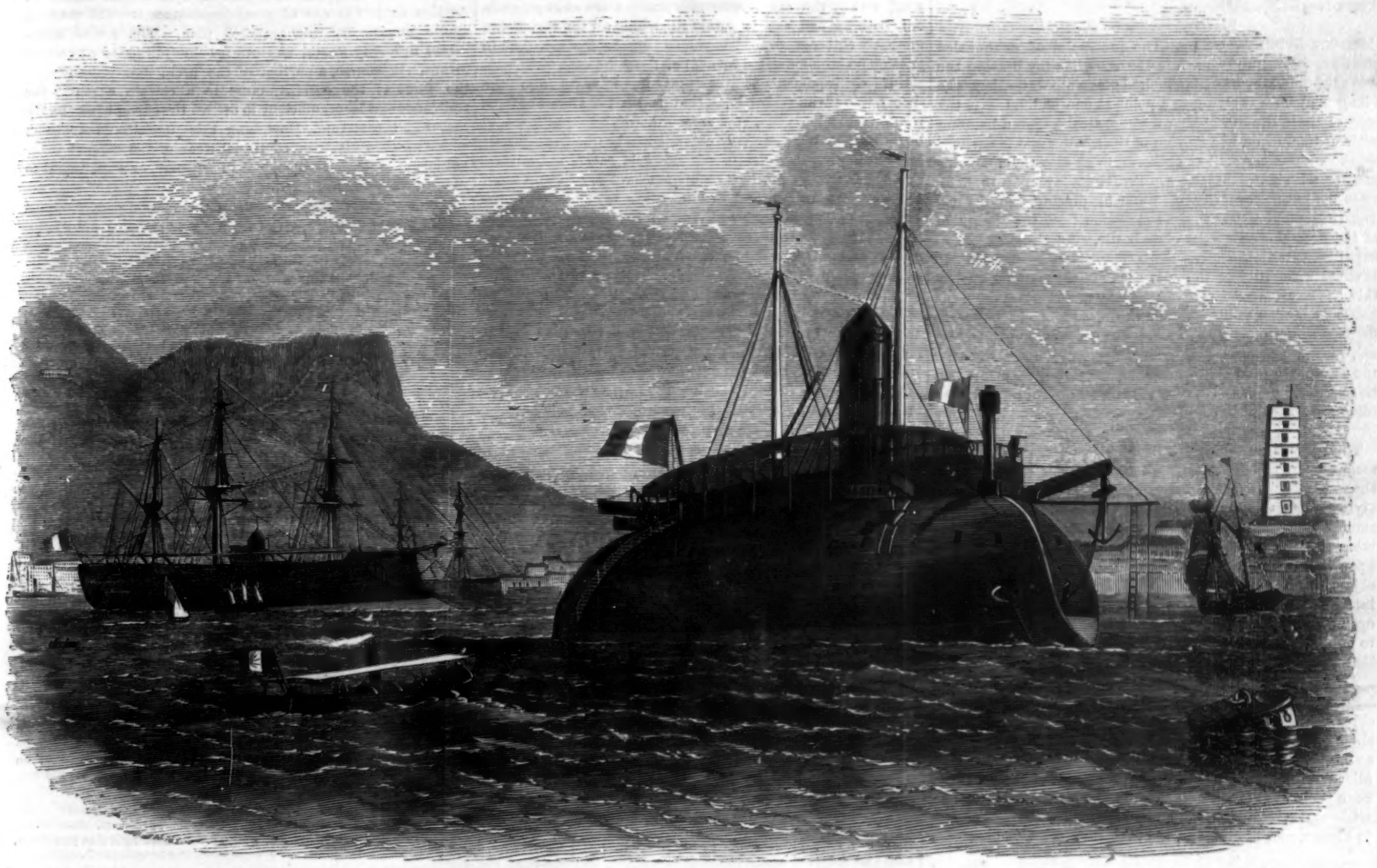
The Antiquity of Man.

The following paper by Mr. J. Crawford, F. R. S. was read in the Ethnological department of the British Association at the late meeting at Dundee:—Man, when he first appeared on earth, was without articulate speech, and, like the lower animals, must have expressed himself by what was little better than mere interjection. He had, therefore, to frame a language—a seemingly difficult achievement, yet one which every savage tribe had been able to achieve, and that not in one place only, but in several thousand separate and independent localities. It followed, then, that as every tongue was regularly constructed and perfect for its own purposes, many ages must have passed before language could have reached its present maturity. Even the languages of a people so low in the scale of humanity as the Australians, incapable of reckoning beyond duality, were found to be not only skillfully, but even completely constructed. It must be evident, then, what ages must have transpired from the first attempts to give names to a few visible objects to the completion even of such rude languages as those of the Australians, Feejeans, and Esquimaux, and how many more must have passed before the discovery of the art of writing. Like languages, the ordinary arts bore abundants proofs of man's antiquity. They were not the results of instinct; but, on the contrary, bore indications of man's brain and hands. The distaff and the loom were as much inventions as the steam engine and the telegraph. They had been invented in many independent localities, and at so early a time that in no instance had there been any record of the discovery. The discovery of metals, without a knowledge of which man must have ever remained a feeble savage, attested man's antiquity. The difficult art of making malleable iron seemed to have been immemorially known and practised even by the rudest people of the Old World, but it might be fairly conjectured that the first discovery must have been made by natives who had previously made considerable advances in civilization, and that from them the art came to be disseminated among ruder tribes. Were the languages of the negroes of Africa investigated—the rudest of which are known to practise the art of fabricating malleable iron—it would probably be found that it was acquired from the Mauritanians, Carthaginians, and Egyptians on the western, and from the Hindoos on the eastern side of the continent. Cultivated plants and domesticated animals also yielded proofs of the antiquity of man. The countries in which—through the auspicious character of the physical geography and the intellectual quality of the races inhabiting them—the earliest civilization sprang up, were Egypt, Syria, the valleys of the Tigris and Euphrates, India, and China; and, in a minor degree, Persia, the region lying between India and China, Japan, and one or two islands of the Malayan Archipelago. In all these writing had been early discovered and a calendar formed—arts indispensable to the rudest record of human events. But it was not necessary alone that the capacity for framing a record should exist, it was not less necessary that the monument containing it should be of durable materials, and be under conditions favorable to its preservation. In regions subject to violent alternations of heat and cold, drought and moisture, the most lasting materials were in time decomposed, while in tropical climates the same destruction was produced by a rank vegetation. Hume made true history begin with the first page of Thucydides, but man's story went back far beyond the time of either Thucydides or Herodotus. Egypt was, far beyond all other countries, that in which the chronicle of civilized man could be carried to the highest antiquity. After many dynasties of gods and demigods, the earliest date which, with any show of antiquity, could be ascribed to the history of Egypt began with the first dynasty of civil writers, and the learned made that correspond with the year before Christ 8986, which would make the first dawn of reliable history 10,838 years old, reckoning to our own time. The pyramids of the first dynasty were built, according to the same authority, Lesueur, B.C. 3460; the great Pyramid, B.C. 3280—respectively 5327 and 5127 years ago. At the earliest of these dates the Egyptians were already a civilized people, in possession of a high scale of numbers, of a calendar, and of the art of writing; while at the latest of them they were certainly a numerous people, skilled in architecture, and equal to the construction of gigantic monuments. This history of the Jews could pretend to no such antiquity as that of the Egyptians, or even as that of the Chinese. There was a general assent among critics in fixing the building of the temple to the year before Christ, 1015—a date which would make it 2446 years later than the construction of the oldest of the pyramids. Reckoning backwards, the exodus proceeded the building of the Temple by 480 years, and the bondage in Egypt was given as having lasted 430 years. There were other races of man which, from their conspicuous position, must have made a very early advancement, although probably not equaling that of the Egyptians. The valleys of the Tigris and Euphrates, from the climate, fertility of soil, and facility of investigation, with the genius of their inhabitants, were formed by nature to be the seat of a very early civilization, and we have abundant evidence of such a civilization having sprung up, rivalling that of Egypt in extent and greatly surpassing it in power. Its perishable monuments, however, do not furnish us with the same satisfactory evidence of antiquity as do the enduring monuments of Egypt. After a reference to the civilization of Assyria and India, the paper concluded as follows:—I may conclude this paper with a recapitulation of the conclusions which may, I think, be legitimately deduced from the facts stated in it. Man, although the latest creation of the class of beings to which he is most nearly allied, is yet of vast antiquity, although that portion of his history which has transpired since he acquired the art of making a durable and authentic record of his own existence, forms but a very small fraction of it. From the time in which he acquired the skill to frame this record, we have to trace him back over the many stages he had to pass through up to the discovery of his remains in caves, and those of his handiwork in the most recent geological formation, "the drift." We must, indeed, go beyond this, and up to his first appearance, when he was without speech, ignorant of every art, and, like the lower animals, chiefly guided by instinct. This is to be inferred from the fact that, where material evidence of man's presence exists, where in caves or "drifts," he is already found in possession of implements of stone, implying a considerable step in advance. But the localities in which the physical geography of the land and the genius of its people combined to effect such an early social advancement as was necessary to be attainment of the skill indispensable to the production of a reliable and enduring record of human events, however rude and imperfect, have been few in numbers, and confined to such as I have endeavored briefly to enumerate. Over the greater part of the earth's surface, auspicious locality and genius of race were not so combined as to have enabled mankind to reach that point. The red man of America, the shepherds of Tartary, the black races of Africa never even approached it. The most highly endowed and the most happily situated of the nations of Europe had reached it only in comparatively modern times, and might not, indeed, have reached it at all had they not borrowed largely from their more precocious neighbors of Asia. The physical geography of the wild region of Tartary, independent of the quality of race, has ever made it impossible that man should have advanced beyond the condition of migrating shepherds, who have now and then united in formidable hosts, and proved the scourges of civilized man. The peculiar privations, both as to locality and race, which characterize some regions of the earth have made all advance in arts beyond what was indispensable to a bare preservation of existence impossible, and of this we have examples in the land of the Esquimaux and of the Australians. In a few localities even this amount of skill had not been attained. Thus Spitzbergen, Nova Zembla, and even Iceland, when first seen by civilized man, were uninhabited; and when we see the Esquimaux living and multiplying and spreading in equally rigorous or even more rigorous climates, it is hard to believe but that they must once have had an aboriginal population, seeing that at least animal food is abundant in them. If they had they must have perished for want of skill to maintain existence. New Zealand would seem to have had no native inhabitants until it came to be colonized by savages and cannibals from the tropical islands of the Pacific. It is difficult in this case, too, to believe that prolific nature should have left so large a country without aboriginal inhabitants, yet it is more probable that the aborigines were either extirpated or absorbed by the more powerful invaders, than that they perished from want of skill in the arts.

The First French Iron-clad.

Our engraving represents the appearance of the great ram constructed by order of the French Emperor, and which made such a nervous stir among the officials of the English navy some two years ago. At that time the performance of our initial *Monitor* and the accompanying efficiency of our other iron-clads had awakened a remarkable interest in the construction of war vessels among other nations. Impregnability and efficiency in assault were the two almost opposing qualities which it was desirable to combine in naval vessels. This was attempted in the *Taureau*, which is an iron-plated ram, defended by its plating and having its only means of offense in a single gun mounted near the bow in a turret. The principal advantage expected from the ship was its immense beak or prow, the ship itself being used as a projectile, to be hurled against those of an enemy. The sides of the vessel are protected by armor extending only about three feet above the water line amidships, and abaft and at the bow by five inches thickness of armor. The engines, two in number, are each of 250-horse power, and the vessel 197 feet long by 48 wide.

As a menace to hostile powers the *Taureau* may be valuable, but as a means of offence or defense it is doubtful if it would equal one of our unpretending monitors.



THE FRENCH IRON-CLAD RAM "TAUREAU."

How Guns are Fired.

The earliest means adopted for igniting the charges of big guns would seem to have been red-hot spikes or bars, which were introduced into the vent, and a pair of bellows for heating the irons formed a necessary part of the artillery equipment of the fourteenth and fifteenth centuries. The inconvenience and danger attending this plan became more conspicuous as the size and power of guns increased, and by the middle of the fifteenth century it had been almost entirely superseded by the system of priming with loose powder, a small train of which was laid up to and through the vent. But the red-hot priming irons were not at once got rid of, for until the adoption of a match made for the purpose, they were still used to ignite the priming powder; and of this match, or of the linstock used for holding it, we find no mention until some time in the sixteenth century. About the beginning of the seventeenth century the priming powder was in part superseded by a small piece of quickmatch, which, being introduced into the vent,acted like a weak tube. To this match the name *portefeu* was applied—a name which we still retain, although the modern "portfire," it need hardly be said, is a very different thing from the ancient *portefeu*. It is remarkable that, although the flint had been introduced about this time, or even earlier, as a means of firing small arms, no attempt seems to have been made for about 200 years to extend its employment to cannon. But the subject did not stand still, and a great improvement was effected in the first half of the eighteenth century, when the quickmatch or *portefeu* was no longer used by itself, but was placed inside a small tube, which could be dropped into the vent, the head of the tube being primed, and the train of loose powder which led up to the vent being done away with. It was not until the beginning of the present century that the simplification of reducing all tubes to one uniform length was effected, but by this time the peculiar action of a tube came to be understood. This action is due to the hole in the center of the composition, the effect of which is to expose a large surface of composition to immediate ignition, and the gas which is thus generated, being subjected to considerable pressure in the cavity, necessarily rushes in the only direction in which an escape is open to it—viz: through the tube—with accumulating force, causing an explosion, the effects of which are directed in the prolongation of the tube. The adoption of a safer and more rapid means of ignition is due to Sir Charles Douglas, father of Sir Howard Douglas, the well known writer on naval gunnery.

In 1778 he formally submitted various propositions "for improving, facilitating, and quickening the service of naval ordnance," including the introduction of flint locks and quill tubes. His propositions were not immediately entertained, and their employment on land never became very general, and tubes ignited by a match or portfire were generally used until 1845 for land-service guns. The next great improvement was the application of the percussion principle of ignition, an improvement of considerable importance at sea, since it made the firing of the gun more instantaneous, and and thus considerably increased the accuracy of the practice made from the ever-moving platform of shipboard. No tubes of this sort were made for actual service until about 1831. They were contrived by Mr. Marsh, of the Royal Arsenal Surgery, and improved upon in 1846 by Col. Dansey, R. A. They consisted of a quill tube, with a small cross-quill filled with a detonating composition, which was exploded by the blow of a hammer fixed to the gun. For land-service,percussion tubes do not seem to have been used until about the year 1845,when they may be considerdd to have been established for both services, although their application to land guns was only partial. Meanwhile attention had been directed to a tube which was brought to this country by a German officer, which depended not upon percussion but upon friction for its ignition. In 1851 Mr. Tozer, of the Royal Laboratory, succeeded in perfecting a copper friction tube of the pattern now in use, which was adopted for all land-service artillery in 1853. It was not recommended for naval service on the ground that any metal tube would be dangerous and highly objectionable between decks. But by 1856 a quill friction tube had been designed and adopted for naval service—the percussion tube being retained, however, in a certain proportion, until last year, when it was formally pronounced obsolete. The introduction of friction tubes was a great improvement for both land and sea service; in the field they superseded the common tubes and portfires, which had rendered the service of the guns slow and imperfect,and the use of which was attended with the risk of setting fire to ripe corn, dry grass, etc., from the ignited ends of portfire which were cut off and thrown down. For sea, garrison, and siege services they got rid of the hammer, making the firing of the gun even more instantaneous and convenient. These are the tubes now generally in use. There remains only to be noticed a system of firing guns by electric agency, which is largely used at proof and for experimental purposes, when it is desirable for the firing party to be under cover. The first employment of electricity for firing gunpowder dates as far back as 1751, and is due to Franklin; and in 1767 Priestley turned his attention successfully in the same direction. Our space will not permit us to detail the various contrivances which have been proposed. Suffice it to say that it was not until 1856 that Mr. McKinlay, the proof-master at Woolwich, submitted his galvanic tube, the principle of which consisted in causing the current of electricity to pass at one part of its circuit through a wire of inferior conducting power, which, becoming instantaneously heated to redness, ignited the priming in the head of the tube in which it was embedded. The last improvement in this direction has been the application of magneto-electricity, which was successfully accomplished in 1862, by Messrs. Abel and Wheatstone. The inductive apparatus used with these tubes is extremely simple, portable, and durable. The electric tubes are used also for firing "time guns" at Edinburgh, Glasgow, Sunderland, and other northern towns, the current being daily flashed at noon along ordinary telegraph wires from the Royal Observatory at Greenwich.—*Pall Mall Gazette.*

Editorial Summary.

SEWING-MACHINE FACTS.—The following interesting statistics we gather from the quarterly returns, made, we believe, under oath, by the several manufacturers of sewing-machines throughout the United States. The figures which we present, and which we have been at some pains to collect, show at a glance the wonderful growth and great importance of this branch of American manufactures. It will be observed that one company alone has produced and sold within the year over *forty-three thousand sewing machines.* It is somewhat remarkable that, during the recent stagnation in trade, this business has been but slightly, if at all, affected. But below are the figures in detail:—

Sewing-machines manufactured and sold, as per quarterly returns, for the year ending June 10, 1867.

Double-Thread Machines:	
The Singer Manufacturing Co.	43,053
The Wheeler & Wilson Mf. Co.	38,055
The Grover & Baker S. M. Co.	32,999
The Howe Machine Co.	11,053
The Florence S. M. Co.	10,594
The Weed S. M. Co.	3,688
The Elliptic S. M. Co.	3,185
The Ætna S. M. Co.	2,958
The Finkle & Lyon S. M. Co.	2,488
The Empire S. M. Co.	2,121
The Leavitt S. M. Co.	1,051
Total double-thread machines.	151,135
Single-Thread Machines:	
The Wilcox & Gibbs S. M. Co.	14 152
The Shaw & Clark S. M. Co.	2,692
The Goodspeed & Wyman S. M. Co.	2,126
Total single-thread machines.	18,970

The foregoing facts and figures we find in the *Financial*

Chronicle of the seventh inst. About a year or so ago, as our readers will remember, we published a series of articles descriptive of some of the great manufacturing interests in this country. We then selected and described the immense establishment of the Singer Manufacturing Company, located in this city, as the representative and leading concern in the department of sewing machines, and we are now pleased to find that we did not in the least exaggerate or over-estimate the importance of the company in question. It is noteworthy and somewhat suggestive that the Singer Company, who did not, as we understand, take the trouble of visiting, or even of sending their machines to the Paris Exposition—who seemingly do not care in the least for either gold medals or red ribbons, and whose name is rarely seen in print—should, nevertheless, eclipse all other sewing machine concerns in the magnitude of their business. There is, of course, a reason for all this, but we leave our readers to find that out for themselves.—*Home Journal.*

Prince Rupert's Drops.—The properties of unannealed glass are beautifully shown in the scientific toy bearing the above title, made by dropping melted glass into water, they take a long oval form tapering to a point at one end. While the body of these drops will bear a smart stroke from a hammer without fracturing, if a portion of the smaller end is snapped off the whole mass will be broken into an almost impalpable powder with a violent shock. Prof. Faraday used to illustrate the incompressibility of water by placing one of these drops in a phial of water, the concussion from the disruption of the drop shattering the glass bottle. Another interesting experiment with the same toy is now given by Reusch. In place of water he fills the vial with melted resin, and when this has solidified he nips off the end of the glass drop, the bottle is broken as before, and the mass of resin is deeply fissured throughout its length. The drop is found as a kernel, loosely aggregated together, but easily detached from the resin, entire. When broken to pieces the fragments will be seen to have the form of a cone on an hemispherical base, like some forms of hail.

Tourist Indicators.—Mr. Bayalgette proposed at the late meeting of the British Association, a plan for providing for the wants of tourists for obtaining local information and supplying reliable topographical information after reaching the summits of eminences. A fixed circular stone or metallic table has radial lines pointing to objects of interest drawn upon it. Upon the line is to be engraved the name of the object, distance from point of view, and other information of interest. A form of this indicator would be found useful in open places in large cities, giving the directions and distances to public buildings, railway stations, etc.

An International Workshop.—The French Emperor has been seriously considering a project for transforming the machine gallery at the Exposition into an international workshop. In estimating the whole of the steam engines employed at 2,000 horse-power, four million francs might be yearly realized by the rent, and, says the engineer Eriesac, "a Cyclopean school would be stationed on the banks of the Seine, without rival in the world, and which would render to Paris, to France, and to industry, the greatest service."

American Mastodons.—Not long ago Dr. Stimpson, of the Smithsonian Institute, heard of the discovery in Hunterdan, Ind.—a place about sixteen miles north of Fort Wayne—of bones of extraordinary size, evidently the remains of some monster. Proceeding to the spot, he unearthed one by one the bones of three mastodons, a male, female, and calf. The skull of the largest is four feet in length, the animal being at least fifteen feet in hight. The remains will form a part of the collection of curiosities in the Bureau of the Chicago Academy of Sciences.

Steel Pens.—If a steel pen is hard and obstinate, refuses to yield when pressed, and annoys by its rigidity, hold it a half minute or less in the flame of a gas light or candle and stick it into water, oil, or tallow. In most instances it will cure the rigidity. In fact, it is a good practice to pass a steel pen through the flame of a lamp before using it. This burns off the oil used in the tempering and prevents that slipping of the ink, or the refusal to flow, generally noticed in all new steel pens.

Preliminary Soundings for the proposed Franco-American cable are announced to be completed. The route decided upon is from Brest to the French island of St. Pierre off the south shore of Newfoundland, thence along the coast to this city. The cable is now making in London, the *Great Eastern* is chartered to lay it, and by next July telegraphic communication, it is hoped, will be opened.

Military Aeronauts do not appear to have afforded any very useful results in the war in Paraguay. Although frequent balloon ascensions have been made, the ascent was but the signal for Marshal Lopez to order the kindling of great fires, the smoke from which covered his camp, and thus prevented the allies from discovering what was going on therein.

POPULAR ERRORS.

This heading is a somewhat favorite one among writers, but not seldom those who attempt to expose these "popular errors" fall into errors of their own, sometimes as egregious as those they condemn. A correspondent sends us a communication intended to notice some popular errors, and we give below the essential portions of his article. He says in effect, that although Lord Bacon knew seven men who attained the age of one hundred years by drinking cider, he does not mention the seven-score men who attained that age drinking only water. Luigi Cornaro reached the age of ninety-eight living from his fortieth year largely upon wine, and Red Jacket saw his hundredth year although he got drunk daily. The hydropathists believe in water and frequent ablutions of the body, as the remedy for almost all the ills flesh is heir to, yet plantation negroes and other people, who shun water as poison, are as healthy as the most rigid followers of Priessnitz. Tradition says that James, "the just," the brother of Jesus, neither took his daily bath, shaved his beard, nor cut his hair.

Our correspondent says further, that he has buried his brightest and most beautiful child—a martyr to science from daily ablution—while his younger born, puny and feeble, and knowing not what a bath is, lives and promises to grow to a healthy maturity. His mother, nearing her eightieth year, was by the carelessness of a nurse allowed to go without bathing and she is rarely ill; while all the rest of her mother's children, bathed regularly by the mother, died in youth (one accidentally drowned) of the same disease.

Our correspondent states that some years ago the theory was advanced in a book that grapes, used alone as food, would insure long life, free from disease, but that it would be difficult to find any grape eaters entirely free from disease and not in danger of death. So it is said salt is unhealthful and not fit to be used by the human family. Yet we know that our perspiration, and our tears are salt, and that the people who live without salt are no healthier, nor longer lived than those who use it habitually. Animals, both domestic and wild, thrive the better for it. Two thousand pounds of hay contain seven pounds of salt; a tun of turnips, four pounds, and bulbs, straw, and grain all contain this essential mineral largely. In the "blue grass" region of Kentucky writers say the girls grow to be more beautiful than in any other portion of the country; yet their food is mainly "hog and hominy" with potatoes and eggs, food that requires a large proportion of salt. Kentucky's stalwart sons, her old men and women, are healthy, hardy, and almost as indestructible as pine knots.

The Day Line.

Mr. Lyman Thayer, of Burlington, Vt., who appears not to be aware that the subject has been fully discussed in the Scientific American, sends us a very interesting and logical exposition of the question of the beginning of the day. He has gone, however, a little further than any of our correspondents, and has invented an admirable device for illustrating the subject to the senses. We quote that part of his paper which describes his invention:—

"I have addressed you on this subject, having learned there had been many remarks in your paper editorially and from correspondents, in regard to this vexed question, and no satisfactory answer given.

"I have just completed a diagram, in good form, representing the revolution of the globe with all the principal places on the globe shown on the face of it, set at their proper meridians as they are actually located on the globe, within the hours—the idea of representing the revolution of the globe with the hours shown, set at their proper places as they are actually located around the globe, is altogether a new and original contrivance or invention, and one that represents the revolution of the globe in a better and more distinct form, than any thing that has ever been invented and used for that purpose. It shows at once the relative position of all the principal places around the globe, and each and all the twenty-four hours as they are applied to each and every locality, at all times, at every revolution of the globe, or at all hours of the day—the hours being local or fixed principles, are attached to the sun, whilst the globe, with all its localities, continually revolving within the hours, is a fact that is not thought of or understood—it also constitutes a universal clock: every meridian is shown and numbered on the diagram, and by setting the meridian you are at, at the hour of the day, all other places stand at the hour or time it actually is at that place: shows where the days begin and end, and how they are applied to the revolution of the globe, and at all times, on how much of the globe it is Monday, for example, and how much it is Tuesday, or any other day, as the case may be: illustrates distinctly and plainly all questions that have been originated in regard to the day's changing, and shows a harmony of their application, and satisfies every intelligent mind on the subject. This diagram is set in a case, similar to the large parlor clocks, the diagram where the face of the clock would be; the revolution is made by a small crank at the side of the case, and the front of the lower part of the case contains an explanation of all its showing in plain form. They cost from five to ten dollars, according to the finish of the case, and would be useful in every family."

The Boiler Disaster at Newark.

On Monday the 30th ult., at Ehehalt & Seydel's Brewery, Rankin Street a boiler explosion took place which was a case of most unmistakable lack of water. The boiler was nearly new, 22 feet long 42 inch diameter with two 12-inch flues. The boiler must have been red hot for with the exception of about 6 inches of the bottom part of it all above is burned to blackness.

Had there been a sufficient quantity of water in it and it had ruptured as it did, the consequences would have been terrible, as it pointed directly in its flight toward dwellings on the opposite side of the street. The end of the boiler, with some three feet of the shell and eight feet of the flues, would have passed through them. The boiler was to all appearance a good and safe one.

ANOTHER LEVEE PLAN.

W. A. J. of Louisiana proposes a novel method of constructing levees on the Mississippi. He would erect on the banks, at a distance of 150 feet apart, a series of abutments of brick, having wings or projections on two sides in a direction parallel with the river banks. Between these abutments he would build the earth levees, not however in a right line, but curved toward the river, the ends of the arch or curve resting on the wings and body of the abutment. Perhaps his idea will be better understood by supposing arches of 150 feet span laid on a horizontal instead of a vertical plane, the top of the arch presented to the water. The banks of the river would then present a succession of curves instead of one straight line or a line following only the sinuosities of the river. He considers that if the earth between two piers was washed away, making a crevasse, it would not so easily extend further as with the present style of embankments. As this subject is one of great importance we will make a single remark on this proposed plan. The arches themselves are only earth, unprotected by piling or any other means. Of course, a portion of the arch, that presented to the force of the current, must to a certain extent, offer resistance—at least sufficient to deflect the current toward the center of the stream. How long this unprotected curve of earth would resist the continual wear of the current is for engineers or our correspondent to estimate, or experiment to determine.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

Rock crystal, sufficiently clear to be used for lenses, has lately been discovered in Arkansas, while digging around a breastwork thrown up during the war.

The total product of the Lake Superior iron mines last year was 306,253 tuns of ore. The reasons for the exceedingly rapid development of these mines since the year 1855 when the shipments of ore were 1,445 tuns—are many and obvious. The deposits are immense, easily worked, and nearly free from those noxious elements which render the flux of most iron or ores difficu and expensive. None of the mines, moreover, are over thirty-five miles from cheap water transportation. while most of them are only fifteen or sixteen miles distant.

Between Oil City and Meadville, says a recent visitor to the Pennsylvania oil regions, there is not one well in operation. It is only a long line of rotting derricks and rusted boilers and engines.

The survey of the proposed railroad from Schenectady to Ogdensburg on the St. Lawrence river, is about completed. The survey was provided for by the Legislature, and has been accomplished under the supervision of the State Engineer. From the St. Lawrence to the Hudson, this road in connection with the Athens and Schenectady "cut-off" will be direct and vastly shorter than any other. The route is pronounced by the superintending engineer a practicable and highly favorable one.

The extensive cultivation of flax in Australia will probably result from the success of late experiments in raising this plant at Portarlington on Port Phillip Bay. A factory for its manufacture has just been started in the suburbs of Melbourne.

The boot and shoe manufactories at Lynn, a town of twenty-three thousand inhabitants, employ seventeen thousand persons, or more than two thirds o its population.

The American company formed for the purpose of constructing a system of local telegraphs on the coast of China, has purchased from the Western Union Telegraph company some 525 miles of telegraph cable originally intended to be laid across the Behring's Straits, but now destined to be laid on such portions of the coast between Hongkong and Shanghai as may be considered advisable.

An immense deposit of toccoline has been discovered near Pescara, in Italy. It is combustible like asphalt and answers for pavements. About 60 per cent. of refined oil, which affords a far more brilliant light than petroleum, may be obtained from it.

Francis Morris, of New York has recently concluded at London, an arrangement with Capt. Pim, of the Royal Navy, looking to the establishment of a new interoceanic line across Nicaragua, by railroad, connecting with steamers on the lake.

The Air line railroad has been surveyed from New Haven to Middletown during the past few weeks. The line is twenty-one miles long, and can be built for $600,000 not including the right of way and the portion already built.

The Reis mine, near Downieville, Cal., has proved itself a most wonderful investment. For sixteen years ninety thousand tuns have been taken from it, and it now has forty-five thousand tons of pay ore in sight, enough to keep two mills running for two years. The total production last year was $234,000. The mine is 5,100 feet above sea level.

The Belgians claim to have been the first to discover the uses of coal, and this discovery, they say, was made by one Hullos, a blacksmith, of the village of Plenevaux, near Liege, in the year 1049, from whose name they derive the word "houille." Coal was first used as fuel in London in the latter part of the thirteenth century; but the smoke was considered so injurious to the public health that Parliament petitioned King Edward I. to prohibit its burning, as an intolerable nuisance. He complied, and issued his proclamation against it. The most severe measures were then employed to abolish its use—fines, imprisonment, and the destruction of furnaces and workshops where it was used.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

Oil Can.—Martin Robbins, Cincinnati, Ohio.—This invention consists in providing a can or vessel which is to contain oil, sirups or other liquids, with a vacuum handle and with an adjustable nozzle, so that the nozzle may be adjusted to any desired angle, with the can, for the purpose of allowing a greater or less quantity of the liquid to be ejected or forced out, as may be desired.

Coal Elevator and Distributor.—Henry C. Clark and Robert B. Little, Providence, R. I.—This invention relates to a new device whereby coal or other articles can be conveyed from a vessel or other receptacle to any particular one of a number of compartments, where they can be dumped into carts or cars if desired.

Three Wheel Carriage.—John Gehr, Mercersburgh, Pa.—In this invention the journals of the forward axle work in boxes attached to a horizontal fixed wheel, which supports a revolving ring to which are attached the couplings that connect the forward and rear axles.

Lifting Jack.—Wm. Green, Holly, Mich.—This invention is a neat, cheap and convenient lifting jack, designed for the special purpose of removing hop poles from the ground.

Attachment for Sewing Machine.—John W. Neill, New York City.—The object of this invention is to provide an attachment for sewing machines for making the plaits or tucks in shirt bosoms, ladies skirts, dresses or garments of any description, whereby the material is creased and folded to any sized plait and sewed through the three folds or thickness of the plait to finish it completely at the same time.

AGUE MEDICINE.—T. M. Daniel, Athens, Ga.—This invention relates to a new composition, or rather application, of certain ingredients which when applied in the manner hereinafter specified, form a cure and preventive for ague, fever, etc.

LOOM.—Daniel K. Fretz, Buckeye, Iowa.—This invention has for its object to simplify and cheapen, and otherwise improve the ordinary hand power loom, wherein the various parts are put in motion by the vibration of the batten.

HOLD BACK.—James C. Covert, Townsendville, N. Y.—This invention relates to an iron hold back to be attached to the hames, and to be connected by a ring to the neck yoke, for the purpose of doing away with the breast strap, and to facilitate the easy adjustment of the harness and the management of the vehicle.

LAMP.—Peter Hoffmann, Constableville, N. Y.—This invention relates to a lamp which consists of two oil chambers, the upper chamber, from which the wick draws its supply, being arranged in such a manner above the lower one into which the oil is poured, that whenever it becomes empty it may be pressed down, its lower end having a plunger fitting close in a tube projecting from the lower chamber, whereby the oil is pumped into the upper chamber. The lamp is not liable to explode, and may be filled while burning without danger.

MACHINE FOR MAKING BULLETS OR SHOT.—C. H. Remington, Dubuque, Iowa.—This invention relates to a new and useful improvement in machinery for making bullets or shot by compression or swaging.

LEATHER ROLLING MACHINE.—Johnson Lombard, Springfield, Me.—This invention relates to an improved machine for rolling or folding sole leather in bundles and consists in a set of rollers and straps in combination with a table and main rolling shaft by which the leather is rolled tightly for packing and transportation.

KING BOLT.—Enos A. Keasey, Ligonier, Ind.—This invention relates to an improved construction of king bolts for carriages and other vehicles, and consists in attaching the bolt with a swivel joint to the axel clip which supports the bolt by a shoulder, so that the cam bolt and head block shall turn together.

GATE.—Hans J. Johnson, St. Peter, Minn.—This inventfon has for its object to furnish a durable and convenient gate, which may be used as a single or double gate, and which may be easily adjusted so as to swing over snow or other obstructions.

REIN HOLDER.—Buel D. Pease, Madison, Pa.—This invention has for its object to furnish an improved rein holder for attachment to the dash board of a wagon or carriage, which shall be so constructed as to hold the reins securely and at the same time allow them to be instantaneously detached.

SCHOOL DESK AND SEAT.—D. C. Wilson, Beaufort, S. C.—This invention has for its object to furnish a strong, simple and convenient manner of making school desks and seats, and it consists in the construction of their frames and in the manner in which they are secured to the floor.

CULTIVATOR.—J. Madison Morse, Sandwich, Ill.—This invention has for its object to furnish on improved attachment for corn cultivators, by means of which the driver may be enabled to ride, which at the same time shall have a tendency to prevent the cultivator from "jumping" or "bounding" and which may be easily and quickly attached and detached.

DRIVING PROPELLERS.—Wm. Lawton, Greenpoint, N. Y.—This invention has for its object to furnish an improved device by means of which the screw may be made to revolve more rapidly than the driving shaft operated by the engine, so as to drive the boat at speed by a slow movement of the engine.

SHOE KNIFE.—Henry Sauerbier, Newark, N. J.—The inventor has received two patents for a knife for cutting or trimming the edges of the soles of boots and shoes. His invention consists in the application of a sliding guard or gage to the blade of the knife whereby the desired work may be accomplished without the liability of cutting the upper of the boot or shoe.

TEST PUMP AND GAGE.—Henry Getty, Brooklyn, N. Y.—This invention relates to a combined pump and gage, more especially intended for the testing of gas or other piping or tubing.

MACHINE FOR CUTTING MITERS.—R. F. Tompkins, New York City.—This machine consists of two cutter blades, arranged to be moved up and down in a vertical plane, and so as to be adjusted with regard to each other at a greater or lesser angle, in combination with rests or blocks for the material or stuff to be cut, correspondingly susceptible of adjustment, and to be brought into the proper relative positions with regard to the cutter or knife blades.

WATER WHEEL.—Wm. Cooper, Hancock, Md.—This invention relates to an improvement in that class of water wheels which are placed on a vertical shaft and are commonly termed horizontal wheels. It consists, first, in an improved application of gates to the wheel, whereby the former may be opened or closed simultaneously with the greatest facility, and retained at any point without interfering in the least with the proper action of the water upon the buckets; second, in a peculiar arrangement of the buckets, the manner of placing them in the wheel, whereby power is obtained both by the impact and gravity of the water.

CORN PLANTER.—Joseph Krebs and August Johns, Massillon, Ohio.—This invention has for its object to furnish an improved machine by means of which the ground may be furrowed, the corn dropped and covered, and the hill marked by the same operation, and which shall at the same time be simple in construction and easily operated.

CHAIR SEAT.—George Heesen, Tecumseh, Mich.—This invention relates to a new and improved seat for chairs, settees, etc., and consists in substituting paper twine for flags hitherto used for such purposes. The seat is constructed in precisely the same way as the flag seat.

SAW-SET.—James C. Woodard, Franklin, Conn.—In this saw-set are combined and obtained many important advantages and features.

COUPLINGS.—E. and H. Butler, Croton Falls, N. Y.—The object of this invention is to prevent the rattling noise and wear of the center bolt or pin by which the shafts or thill are hung or pivoted to the couplings, and for this purpose the invention consists in a novel application to the said center pin or bolt, of an elastic cushion or cushions whereby the desired end is effected.

COMBINED ERASER AND LETTER OPENER.—George C. Barney, Philadelphia, Pa.—This invention consists in a blade of steel or other suitable material having two edges made of a curvilinear shape intersecting each other at one end of the blade where the blade is sharp pointed; the outer or convex edge of the blade being made suitable for use as an eraser, with the inner or concave suitably sharpened for cutting paper more particularly.

WATCHES.—J. A. Harmann, New York City.—This invention consists in so constructing the pendant of a watch as to receive and hold the key adapted to such watch whereby the key is always at hand when to be used for winding the watch movement or setting or adjusting its hands, and furthermore the socket of the key, cannot becomed clogged or stopped up with dirt, etc.

HENS NEST.—C. W. Blackman, Bridgeport, Conn.—This invention relates to a new and improved nest for hens and has for its object the prevention of more than one hen occupying the nest at the same time.

WINDOW SCREENS.—James McFeeley, North Woburn, Mass.—This invention consists in so constructing the frame to a window or door screen in such manner that water can be made or allowed to flow over the surface of the screen from top to bottom whereby while the dust etc., is more perfectly excluded, the atmosphere of the room is rendered cooler and more pleasant.

CENTER BOARDS FOR VESSELS.—John G. Saunders, Narragansett, R. I.—This invention relates to a new and improved mode of laying center boards in vessels, whereby the center board may be raised and lowered with its lower edge parallel with the keel of the vessel and center board, in case of meeting with any obstruction when the vessel is sailing, allowed to rise and pass over the obstruction without sustaining anp injury whatever, and also admit of being readily detached from its trunk at any time when necessary for repairs.

MOUSTACHE GUARD.—A novel contrivance was patented on the 23d of July last by Chas. E. Mitchell, who is now residing at the Astor House, New York, in the shape of a mustache guard. It is made of thin metal and by means of springs ingeneously placed can be instantaneously attached to or removed from a cup or tumbler and carried in the vest pocket when not in use. By its use coffee or other liquids can be drank without wetting the moustache. Mr. M. will be happy to show his invention to persons taking an interest in novelties of the kind or, to dispose of rights to manufacture.

LOOM PICKER.—Bradford Nichols, Phenix Village, R. I.—This invention relates to a new and useful improvement in the picker of a loom, and consists in making the shell or casing and binder of the picker of rawhide, and securing it to the staff by flanges on each side in such manner that it cannot slip out, nor break, nor allow the filling to come out.

CLOTHESPIN.—R. G. Britton, Springfield, Vt.—This invention relates to an improvement in clothespins, and consists in uniting two wooden pieces by an iron pin or rivet, and inserting a spiral spring between the ends, on one side, to close the other ends upon a clothes line to keep the clothes fast when hung out to dry.

HORSE COLLAR.—James G. Haymaker, Salem Cross Roads, Pa.—This invention relates to an improvement in horse collars, and consists in a novel construction and arrangement of the lock upon the hame plates and pads whereby the collar can be placed on the horse without passing it over his head.

DRESSER COPPERS AND WARPER PLATES.—Ambrose J. Nichols, North Providence, R. I.—This inveation relates to machinery for the manufacture of textile fabrics, and it consists in an improvement in dresser plates or coppers, as they are usually called by manufacturers, and which improvement is also applicable to warper plates, as both the dressers and warpers are used for similar purposes.

THILL COUPLING.—E. M. Naramore, North Underhill, Vt.—The object of this invention is to provide a wagon thill and pole coupling that may be readily coupled and uncoupled, and firmly and securely held in place.

TELESCOPE.—W. Kuebler and F. Seelhorst, Philadelphia, Pa.—This invention relates to a new and improved method for adjusting the eye-pieces and object-glasses of telescopes.

SAFETY VALVE.—John N. Wrigley and George Smith, Newark, N. J.—This invention consists in so arranging a valve or a valve seat in the coating or shell that it is nearly balanced by the steam, thereby rendering it much more sensitive than the ordinary safety valve now in use and consequently much more safe.

STEAM VALVE AND VALVE MOVEMENT.—John N. Wrigley and Geo. Smith, Newark, N. J.—This invention relates to a new and improved method of admitting steam to the cylinder of a steam engine.

STOVEPIPE AND SMOKE STACK JOINTS.—Wm. Stine, Elmore, Ohio.—The object of this invention is to improve the manner in which stovepipe, smoke stacks, etc., are usually joined together and to facilitate the operation of putting them up and taking them down,

CARRIAGE WHEELS.—John G. Buzzelle, Lynn, Mass.—This invention has for its object to furnish an improved carriage wheel, light, simple, strong, and elastic, and which can be readily tightened or strained whenever desired.

ATTACHMENT FOR SCHOOL DESK.—D. J. Stagg, New York city.—This invention relates to a new and useful attachment for school desks, for the purpose of holding or supporting drawings, maps, or any papers, while being copied. The invention consists in having a frame or a drawing board fitted in a slot or opening in the desk, and arranged in such a manner that the frame or board, when desired for use, may be raised up and adjusted in proper position relatively with the occupant of the desk, to receive the drawing or other article to be copied, and, when not desired for use, capable of being lowered or let down within the opening of the desk, so as to be entirely out of the way.

HORSE HAY FORK.—A. J. Parviance, Keosauqua, Iowa.—This invention relates to a new and useful improvement in operating horse hay forks, so that the same may not only be elevated as usual, but also drawn over the spot or stack where the hay is to be dropped or discharged. The object of the invention is to facilitate the stacking and storing away of hay with the horse hay fork.

SEEDING MACHINE.—Edwin Ritson, Maltaville, N. Y.—This invention relates to a new and improved seeding machine, of that class designed for sowing seed in circles.

PLOW.—Mason Prentiss, Cambridge, N. Y.—This invention relates to a new and improved plow of that class which is provided with a double mold board, and is more especially designed for cultivating crops. The invention consists in the application of an adjustable shoe at the rear of the share or mold board, the share being arranged in such a manner that it may, with the greatest facility, be adjusted higher or lower to graduate the depth of the furrow, as may be required.

MACHINE FOR KNEADING DOUGH.—W. B. Morrison, Muskegon, Mich.—This invention relates to a new and improved machine for kneading dough, and it consists in piercing the bottom of a box or dough receiver, with a concave surface in or over which a series of plungers work.

VENTILATING ATTACHMENT FOR MILL-STONES.—Hezekiah Mc Eldowney, Dixon, Ill.—This invention relates to a new and improved means for causing a circulation of air to pass down between the exterior of the upper mill stone and the curb thereof, whereby the stone is kept in a cool state, and the flour prevented from "sweating," as it is technically termed.

SHIFTING STEP FOR VEHICLES.—Edward Miller, Milwaukee, Wis.—This invention has for its object to furnish an improved shifting or detachable step for attachment to vehicles to enable persons, and especially ladies, to get in and out conveniently.

CHURN.—W. C. Peck, Bridgeport, Ohio.—This invention has for its object to furnish an improved rocking churn, simple in construction, convenient to be used, and which will do its work quickly and thoroughly.

ELLIPTIC SPRING BRACE.—M. Barker, Great Valley, N. Y.—This invention has for its object to furnish an improved means by the use of which elliptic springs may be strongly and securely braced, and which at the same time will allow either of said springs to act without a strain upon the other.

GATE.—A. Tandy, Columbia, Mo.—This invention has for its object to furnish an improved gate, simple in construction, and durable, and which can be opened and closed over obstructions, or up or down hill, as may be desired or necessary.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

W. B., of Ohio, thinks it would be a good thing to silence an enemy's guns by firing, point foremost, into the mouth of the guns a number of square tapered files with the teeth cut the reverse way, which would plug or lodge the enemy's shot and burst their guns when fired. So it would; but will W. B. please inform us about his plan for getting so direct an aim as to shoot into the mouth of those cannon he intends to burst.

J. O. B., of Mass., has two stoves in his shop in which he burns wood, one of which with a funnel of 40 feet in length drips a great deal of liquid matter every day; and the pipe has to be frequently taken down and cleaned of a deposit resembling coal tar. The other, on the contrary, gives no such trouble. He wishes to know "what's the matter?" Wood when subjected to slow combustion is more or less distilled and one of the products of such distillation is pyroligneous acid which when heated still more becomes a dark, glutinous substance. It may be seen exuding from the ends of logs when heating on the andirons of an old-fashioned fireplace. The remedy is to put his stove and funnel in order to produce a draft and insure combustion.

J. T., of N. Y., asks what will remove the stain of claret from a table cloth, salt not always being efficient. Try oxalic acid.

N. D. F., of Conn., asks how ale and cider barrels can be thoroughly cleaned. We think a strong solution of sal. soda followed by hot water will do it.

W. M., of N. Y., wishes to be informed if hydrogen gas can be made available for heating or cooking purposes. It certainly can, but its expense is a serious objection, except where hydrogen can be had for next to nothing.

L. W. S., of Mass. "Can you give me information how to burn up the smoke from a planing mill, the furnace fires of which are from shavings and the waste of the mill?" Refer to the article on "Boiler Setting" first page of No. 9, current volume.

T. H. B., of Texas.—"What is the best way to keep a tubular steam boiler free from mud and scale, the latter of which accumulates rapidly from the use of hard water?" Blow off frequently, which will remove the mud and a part, at least, of the scale. One great fault of those who run boilers of any kind is their disinclination to perform this necessary work often enough.

R. B., of Pa., says there is in use in Philadelphia a check valve to steam boilers intended to prevent the pump from thumping. It is placed about two feet from the pump on the suction pipe and is supposed to admit about one fifth of air at every stroke of the pump, forming a cushion for the plunger and then passing into the boiler. It is used on the Harrison cast-iron boiler advantageously, and the question is whether this air endangers the boiler and whether such a pump could injure a wrought-iron boiler. In reply we would say that the air pumped into the boiler cannot injure it whether of cast or wrought iron; neither can we see how the injection of air with the water could benefit a boiler or assist in generating steam.

J. M. W., of N. Y., says: "Believing myself to have discovered a substance which I call liquid phosphorus or oil of phosphorus—the result of an experiment in match making last spring. Allow me, if you please, to ask information." Certainly; but it would, perhaps, be more satisfactory to you and us if you had described your liquid phosphorus and denoted the sort of information required.

F. K., of Mo.—"Could you give a simple and cheap recipe for softening hard water for washing purposes; the wells are in limestone rock?" We knew of nothing simpler and cheaper than sal. soda or wood ashes.

L. M. T., of Mo., desires to know the process of preparing birds and other specimens of animal life by retaining the bones and flesh. Probably D. Van Nostrand, 192 Broadway, can furnish a treatise on the art of the taxidermist.

G. McD., of N. Y., cannot succeed in depositing a film of pure silver upon silver. The battery fails him entirely. Certainly the battery may be made to give an even deposit of pure silver. Probably your failure is due to lack of skill or imperfection in the materials employed.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Parties having a Paper Mill for sale or lease will please address, with particulars, Wm. H. Gandey, Lamberiville, N. J.

Tin-Ware Manufacturers and Manufacturing Companies send address to Jno. I. D. Bristol, Detroit, Mich.

Wanted, address of manufacturers of Try-Squares. John Burgum, Concord, N. H.

Wanted, manufacturers for the best double-shovel (iron) plow in the market. Address Ray & Shalters, Alliance, Ohio.

Send prices and descriptions of wood-turning lathes to I. J W. Adams, Salisbury, Md.

Manufacturers of Pumps for raising water from deep wells, please send circulars to D. Arthur Brown & Co., Fisherville, N. H.

Manufacturers of Paper-bag machinery, and paper manufacturers send circular and price list to J. Walter, Baden, Mo.

Capitalists, seeking investments, are invited to investigate the merits of "Cotton Tie," illustrated in present number.

Oak Belting.—Large Lot for sale very cheap, in lots to suit. Address S. T. Wellman, Nashua, N. H.

EXTENSION NOTICES.

William H. Sweet, administrator of the estate of Henry L. Sweet, deceased, of Foxborough, Mass., having petitioned for the extension of a patent granted to the said Henry L. Sweet, the 20th day of December, 1853, for an improvement in guides for sewing on binding, for seven years from the expiration of said patent, which takes place on the 20th day of December, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 2d day of December, 1867.

Joseph Nason, of New York city, having petitioned for the extension of a patent granted to him the 2d day of January, 1854, for an improvement in arrangement for cutting screws in lathes, for seven years from the expiration of said patent, which takes place on the 2d day of January, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 16th day of December next.

Hezekiah B. Smith, of Smithville, N. J., having petitioned for the extension of a patent granted to him the 16th day of January, 1854, for an improvement in mortising machines, for seven years from the expiration of said patent, which takes place on the 16th day of January, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 23d day of December next.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,362.—MANUFACTURE OF WHEELED VEHICLES, ETC.—John S. Campbell, Newton, N. J. Aug. 9, 1867.

2,468.—APPARATUS FOR RAISING WATER, ETC., BY STEAM POWER.—Wm. L. Horne, Batavia, Ill. Aug. 22, 1867.

2,475.—CARPET STRETCHER AND TACK DRIVER.—Wm. Brown, New York City, Aug. 31, 1867.

2,488.—MANUFACTURE OF IRON AND STEEL.—Alexander L. Holley, New York City. Aug. 27, 1867.

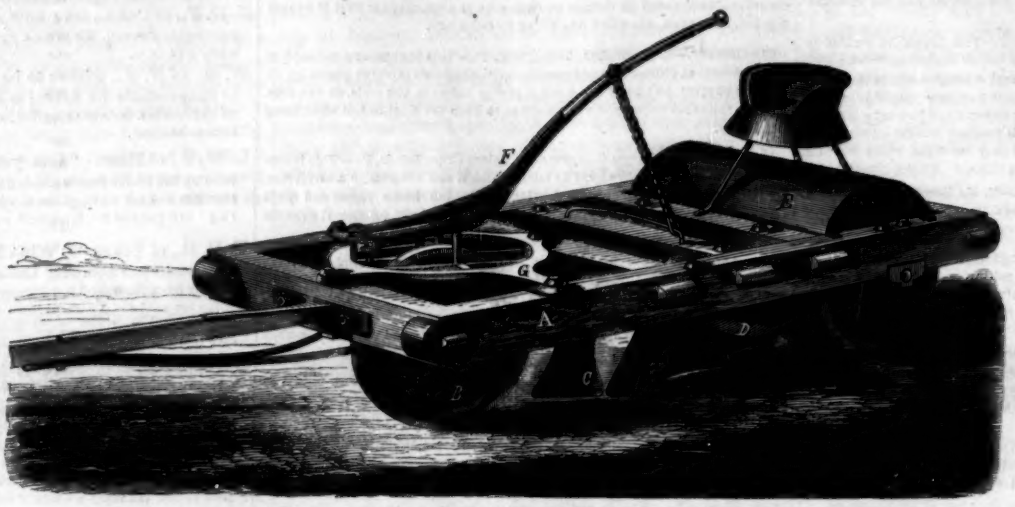
2,496.—APPARATUS FOR SUBMARINE EXPLORATION.—George Wrightson, New York City. Aug. 29, 1867.

2,506.—PADDLE WHEELS FOR WATER CRAFT.—Wm. R. Manley, New York City. Sept. 4, 1867.

2,551.—WIRE HEDDLES FOR LOOM HARNESS.—Darius C. Brown, Mass Sept. 9, 1867.

Implement for Repairing Roads.

The machine seen in the engraving is intended primarily for filling in the ruts, leveling the surface, and compacting the material of roads. It is a plow, scraper, and roller combined, and appears to be a very useful implement for agriculturists. A strongly braced rectangular frame, A, of wood, supports all the working parts, which consist of a guiding wheel, B, colter, C, plow share, D, and roller, E, with their appurtenances. The wheel, B, is mounted in a circular metallic frame by means of arms passing through the frame on each side of the wheel and extending up to a forked lever, F, by which the forward end of the whole machine may be raised. The circular frame on which the wheel is mounted partially rotates in another, denoted by G, and bolted to the frame, A. It will be seen that the driver may guide the machine or regulate the hight of the forward part, and thus the depth of the plowing, by means of the lever, which is easily accessible from his seat.



MINOR & WARD'S ROAD REPAIRING MACHINE AND COTTON LAND RIDGER.

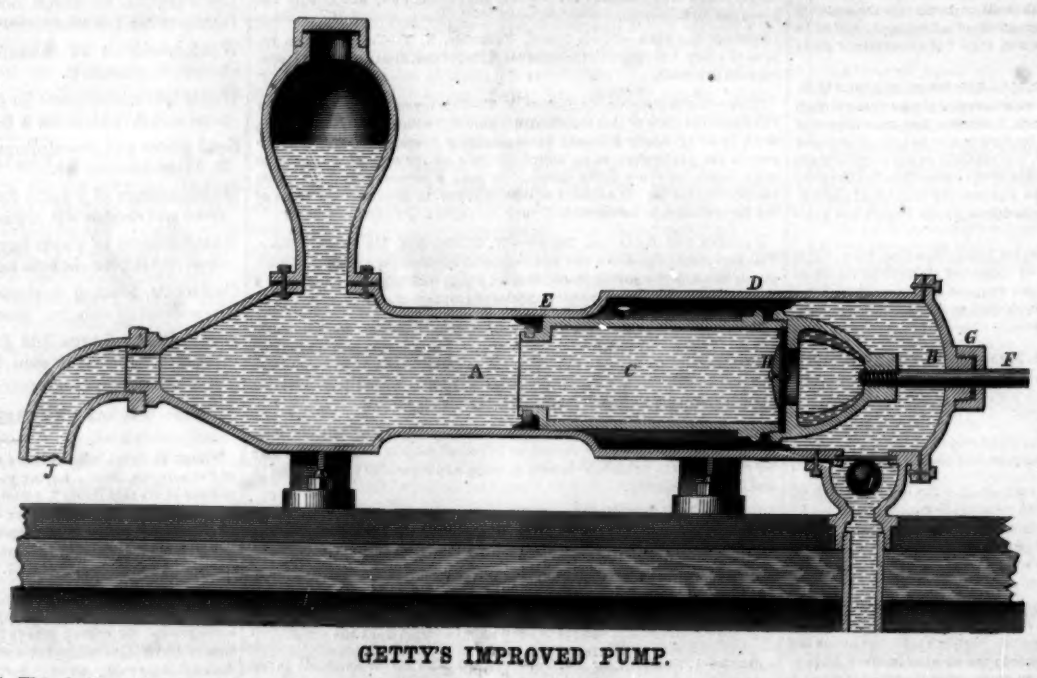
The machine may be drawn by a yoke of oxen or span of horses. When in use for repairing roads the guiding wheel runs in the rut to be filled, and the plow shares, D—of which there are two, one on each side, converging at their rear ends—lift the earth or gravel from each side of the rut and deposit it in the depression. The colter, C, which is simply a double plow share, is used only when there are very hard and compacted ridges in the road to be broken up. Whether in filling ruts or leveling ridges the heavy roller, E, over which is the driver's seat, compresses and solidifies the work. The machine works over one half of the road at a time and then returns on the other side. The patentees confidently claim that one man with the team can finish five or six miles per day and do it better than fifty men with picks, shovels, etc.

By the removal of the roller and the substitution of a shaft carrying a pair of wheels, the shares being taken out, the machine is adapted to ridge land in parallel rows with a channel on the top of the ridge for the seed, as for cotton and some other crops. Patented through the Scientific American Patent Agency Sept. 17, 1867, by Minor and Ward, who may be addressed at New Bedford, Mass. Models are now on exhibition at the Fair of the American Institute, New York city.

Improved Double Acting Pump.

Few mechanical contrivances have been the subject of so many improvements, or attempted improvements, as the pump, whether the ordinary lifting pump or the combined lifting and forcing pump. In those of the last mentioned character the principal difficulty has been that the upward flow of the water has been checked and turned in a new direction before any proper results could be obtained. This entails an immense loss of power which ought to be employed in raising the water. The prevention of this loss of power is the object of the inventor of this pump; he constructs it on the principle of the incompressibility of water, using the water itself as a ram or solid piston at each alternate stroke.

The engraving is a sectional view of the pump when used in a horizontal position. The cylinder of the pump is of unequal diameter, the portion, A, being much less than the chamber, B. Inside the cylinder is the hollow piston, C, packed at the ends, D and E, and worked by the piston rod, F, through the stuffing box, G. This hollow plunger is open at the forward end and closed at the rear end by the flap valve, H, of the inlet pipe, and J, is the discharge pipe, which may be carried in any direction. In the engraving the pump plunger is seen as making a forward stroke, the water contained within it and held by the valve, H, acting as a solid ram to force the water in the cylinder, A, out of the discharge pipe, J. The return stroke opens the valve, H, by the back pressure of the water in B, which rushes through the cylindrical plunger, C, to be in turn discharged. It will be noticed that the chamber, B, is of much greater diameter than the plunger, C, so that they bear the relative proportions of two to one. This insures always a full cylinder and makes a continuous stream, without check or interruption. One of these pumps in the fair of the American Institute delivers a continuous, full, round stream by the working of a vertical lever moved by one hand, requiring no greater expenditure of power than that which could be exerted by a child of eight or nine years. When used for very deep wells the pump is vertical and the hole or holes seen in the side of the chamber, B, are stopped and the down or backward stroke of the plunger creates a vacuum in the annular space between the chamber and the hollow plunger, which, on the forward or upward stroke assists in raising the weightof the connecting rods and the water column. Valves for opening and closing these holes can be readily attached which may be operated automatically. An air chamber may be connected to the pump if desired,but it is not necessary. It is understood that this pump may be arranged to work either horizontally or vertically.



GETTY'S IMPROVED PUMP.

It was patented July 23, 1867, by Henry Getty, of Brooklyn, N. Y., who may be addressed for further particulars or the sale of rights, etc., at McNabb and Harlin's, 86 John street, New York city.

Crushing Coal for Burning in Boiler Furnaces.

A few days since we inspected an apparatus erected in the fireroom of the steamer *Warrior* at the Delamater Iron Works—Mulford & Ripley—for pulverizing the coal and forcing it into the furnaces, over the fire, by means of a blowing apparatus.

Circumstances prevented us from examining the internal structure of the crusher and blower as critically as we should have been pleased to do, but the former was apparently a pair of cast iron rollers, over which was erected a hopper for the purpose of supplying them with coal; from the under side of these rollers the pulverized fuel is emptied into a blower with tight fitting, revolving pistons, which force it through about five inches diameter pipes and sprinkle it over the fires.

The crushers and blowers, of which there are two each, are driven by a 15-inch by 15-inch cylinder engine erected on the deck. It transmits its motion to the crushers and blowers through an intermediate shaft driven by gearing and from which belts are led to them. Altogether it looks like a rather complicated fix.

With regard to the efficiency of this contrivance we cannot speak from observation, but we are free to confess that for use on board of steam vessels it impressed us very unfavorably. Indeed we were unable to discover what was the object of the engineer who contrived it, except perhaps to save the trouble of opening the furnace doors to "fire up," but this seeming advantage is attended, it seems to us, with several serious drawbacks, among which is the fact that if the draft is good a considerable portion of the "powdered coal" will be carried into the flues and up the chimney.

There are only four furnaces in the *Warrior's* fire room, and this fact, taken in connection with the machinery necessary for this small number of furnaces, will enable one to form an idea of the complication such an apparatus would render necessary in the fire room of a first-class ocean steamer.

Artificial Stone for Building—Ransome's Process in America.

We have from time to time called the attention of our readers to Mr. Ransome's process of making artificial stone for building, and especially in our issue of 25th July, we copied an article from *Engineering* which explained the process of its manufacture, and gave the results of such experiments as had then been tried to test its value as a building material.

Recently, through the kindness of Hon. David Naar, President of the "Ransome Patent Stone Co., of New Jersey," we have had an opportunity of witnessing the process ourselves. We confess ourselves to have been unexpectedly pleased not only with the simplicity of the process, but with the facilities which the company have for the manufacture of the stone, and the beautiful results which they accomplish.

The article above referred to went so fully into the *modus operandi* that we do not deem a long explanation of the chemical process necessary. It is a successful imitation of nature's own methods: Grains of sand are agglutinated by cement. The sand is washed from all impurities, thoroughly dried, and intimately mixed with the silicate of soda of commerce. It is then molded into the form desired and subjected to a bath of the solution of chloride of calcium. A double decomposition takes place and induration commences. In a few moments the plastic mass begins to ring under a slight blow of the trowel. The results of the decomposition are the insoluble silicate of lime and chloride of sodium (common salt), which is easily soluble in water. As soon as the mass has hardened throughout, or when the chloride of calcium has been brought in contact with every particle of the sand so mixed with the silicate of soda, it is boiled in a solution of chloride of calcium, which drives the salt to the surface, from which it is washed by a shower bath of water. The stone is then dried and is ready for use.

The stone, as compared with the sandstones in use, is considerably cheaper, and when capitals or ornamental moldings are required, the cost is not more than one eighth. Its weight is about 140 pounds to the cubic foot. The color is about the same as the Portland stone, depending of course upon the color of the sand used. It is easily colored, however, to any tint required. It has been subjected to the severest tests as to its durability, and so far shows greater resisting and durable qualities than the sandstones in use.

It is being made not only in Europe but in several parts of this country, and is beginning to be used for building purposes, and the true test, that of time and the weather, is being applied to it.

We cannot predict that it will endure as long as the Pyramids, but its composition is such, and it so well stands the tests to which it has been subjected, as to give us good reason to hope and believe that it is equal if not superior in durable qualities to most of the building stone in use.

Those who have been foremost in undertaking the manufacture of the stone in this country deserve success, and we believe the article will fill a want long experienced by builders, and we hope they will not let prejudice deter them from giving it a fair trial.

It is not remarkable that such a discovery has been made; the wonder is that it has not been made before. Our exchanges from England mention the Ransome process as a practical success for nearly every purpose for which stone is used, even to the manufacture of grindstones. What Great Britain can do in this line can be equally well done by us, and we predict for the New Jersey company financial success.

New Use of a Device.

A new use of a thing without being claimed in combination with some other and new element, or as part of a new combination, in the device where such thing is introduced, is not patentable, it being considered simply the application of an old thing to a new use. Toward such a view would appear to be the leaning of the courts. The point was touched upon in the case of West *vs.* Silver Wire and Skirt Manufacturing Company lately decided in the Southern District of New York.

Color of Sunlight.—M. Brucke has observed that diffused solar light, instead of being perfectly white, is tinged with red. The light of burning magnesium, which appears to be so like sunlight, has a tinge of violet.

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN. S. H. WALES. A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York

☞ "The New York News Company," 8 Spruce street.

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent to them will be promptly attended to.

☞ Messrs. Trubner & Co., 60 Paternoster Row London, are also Agents for the SCIENTIFIC AMERICAN.

VOL. XVII., No. 16....[NEW SERIES.]....*Twenty-first Year.*

NEW YORK, SATURDAY, OCTOBER 19, 1867.

Contents:

(Illustrated articles are marked with an asterisk.)

*Obituary—Elias Howe, Jr.	241	Recent American and Foreign Patents	246
The British Association	241	Answers to Correspondents	247
American Institute Fair	242	Inventions Patented in England by Americans	247
Artesian Wells	243	Extension Notices	247
The Comets Again	243	*Implement for Repairing Roads	248
The Rotary Force Centrifugal	243	*Improved Double Acting Pump	249
Pumping Hot Water for Boilers	243	Crushing Coal for Burning in Boiler Furnaces	248
Volumetric Estimation of Barium	244	New Use of a Device	248
The Sun's Diameter	244	The Lesson of the Shoeyburyness Experiments—How Little England has Profited by It	249
Ammoniacal Gas as a Motive Power	244	An Important Question	249
*Ober's Patent Toilet Glass	244	Industrial Education—What a Liberal Manager has Accomplished	249
The Antiquity of Man	244	The 29th Street Boiler Explosion	250
*The First French Iron-Clad	245	The Machinist's Apprentice	250
How Guns Are Fired	245	Patent Claims.....250, 251, 252, 253, 254	
Editorial Summary	245	Pending Applications for Reissues	254
Popular Errors	246		
The Day Line	246		
The Boiler Disaster at Newark	246		
Another Levee Plan	246		
Manufacturing, Mining, and Railroad Items	246		

THE LESSON OF THE SHOEYBURYNESS EXPERIMENTS. HOW LITTLE ENGLAND HAS PROFITED BY IT.

That England has profited less than her maritime rivals from the millions of pounds she has so liberally expended in experimenting with artillery, rifling, projectiles, and armored targets of almost every possible description, is a very remarkable fact. This fact—as curious as it is true—does not speak very highly with respect to the engineering talent and judgment which have directed the fabrication of her heavy ordnance and her iron-clad navy.

After the experiment with the 13-inch smooth bore at Shoeyburyness, Sept. 13th, 1862—five years ago—against the *Warrior's* section of 4½-inch plates, 18 inches of teak, and an inner skin of iron, to suppose that a target similar to that one with the exception that it had 3½ inches more iron, could resist the 15-inch gun, seems to us to betray a remarkable misapprehension of the important national problem committed to the English naval constructors and gunmakers for solution.

The complete penetration of the 8-inch "*Warrior* target," backing, and inner skin, by the 15-inch gun on Sept. 26th, as stated by the Atlantic cable, points out to every one who can read, that the iron-clad fleet of England is as vulnerable to the guns likely to be brought against it as the old wooden vessels were to the guns cast to attack them with. That the plans on which the English artillery have been built will not give to large calibers the strength necessary to attack first-class iron-clads, appears to be established by a retrospective view of the experiments of the past five or six years. Commencing in 1862 with 10½-inch wrought iron rifles, increasing shortly afterward to 13½-inch, we now see (and 1868 is close at hand) a puny weapon, the 9-inch rifle, the best gun in the English artillery parks, while on the other hand the maritime nations in the north of Europe—Russia and Sweden—knowing from the publicity of the English experiments, what not to make, are casting, as fast as they can melt the iron, duplicates of the very gun John Bull has just proved to the world can send its big round shot through any iron-clad he has built or is building.

Thus England, by the foolishness of her gunsmiths and constructors, has been materially assisted into such a position that her influence in European politics is nearly if not quite, wiped out.

With respect to the last exploit of the Shoeyburyness artillerists and "select committee men" in bursting their target and their reputation at the same time with the 15-inch gun, we do not believe they would have imported that weapon if they had any idea of its capabilities. Already had the highest authority on ordnance in England, Captain Noble, demonstrated, in an elaborate official report, that the maximum force of the 15-inch shot was only 8,658,760 foot-pounds (while he has himself proved by late experiments that it is 17,000,000 foot-pounds!) Again, neither is it likely that this officer and the "select committee" would have permitted the big smooth bore to demonstrate its power by the use of full charges against the target had it not been for the criticisms on his calculations and trials, by an American engineer, which were republished in several of the English journals. As it is, the extraordinary tests to which Noble has put the gun, failing, as was no doubt the desire, to burst it, exhibit its power in a stronger light than would otherwise have been the case. On the first trial against the target on July 26th, it will be remembered that after the first two rounds with cast iron shot, a steel shot weighing 498 pounds and no less than 14·945 inches in diameter (see *London Times*) was used, or in other words the windage was only $\frac{55}{1000}$ of an inch; in fact, this shot fitted as tight as a steam engine piston—it was as close a fit as could be got in the bore. The gun was not injured, and the next step was to raise it to an elevation of 32°, imbed it in timber, so that proper recoil was prevented, and blaze away with 100-pound charges, or 40 pounds more than they had used against the target. The gun also stood this trial without injury, and as several of the prominent British journals wanted to know why 100 pounds was not used against the target, there was nothing left but to accede to this very proper request. The trial was made (we believe with cast iron shot), and the target, nearly twice as strong as any British iron-clad afloat, was penetrated (according to the American system of penetration), and smashed. A comparison between the hole made by the 15-inch and the sort of gimlet penetration effected by the 9-inch, will show the difference between the British "awl hole" system and the American penetrating system. But a pretty correct idea of the appearance of the hole made by the 15-inch can be had by a photograph in our possession of the 4½-inch *Warrior* target after it had been penetrated by the 13-inch smooth bore in 1862. We trust, however, that Brother Bull will not omit to have a photograph taken of this last hole.

It is not unlikely that the 15-inch gun or the big smooth system is too plain a subject for the highly scientific writers on artillery and armor in English journals. They seem to be completely bewildered by the "hifalutin" talk (as the *London Army and Navy Gazette* has it) of their gun makers and ordnance officers. Our readers are no doubt aware that it is the habit of English officers, both of the army and navy, as well as scientific men in civil life, when a new idea strikes them, to rush into the amphitheater of one of their "Institutions," and either deliver a "lecture," read a "paper," or have a "conversation." These efforts are published with proper ceremony, and are called the "proceedings" of "Institution" so and so.

We remember very well the "papers" of such men as Armstrong, Coles, Halstead, Tyler, and many others, read and published during the progress of our rebellion; they often proved very entertaining to their audiences, as in many cases they proved, beyond the shadow of a doubt, that things which we Americans had already accomplished could not be. For example, that monitors could not possibly go to sea! By the use of a hydrostatic press, it might be possible to squeeze the "papers," "lectures," "conversations," and "pamphlets" of the naval, military, and civil *savans* of John Bull's land, on the subjects of guns and iron-clads alone, into the office—which is not very small—in which we are writing.

No antiquarian library on mechanical subjects can be complete without a set of these valuable documents.

These persons have been in the habit, as soon as an innovation in the naval or engineering line is broached, to grab it at once, shuttle-cock it about, until it is so befogged that the originator of the project himself would not recognize what they are talking about. So many irrelevant side issues are started by these ingenious investigators, that both writers, readers, lecturers, and listeners, were very often so confused and entangled, that they forget what it was that "light" was to be thrown on. The chief of artillery of the London *Times*, the scientific reporter of the Pall Mall *Gazette*, and the ordnance officer of the *Engineer*, appear to have wallowed in "papers," "reports" (Noble's in particular), and "discussions," until their minds are in quite a mixed up state. Here are some extracts from their last disquisitions on the big smooth bore. The chief of artillery of the *Times*, after stating that on the trial "for range," (*i. e.*, the trial to see if they could burst the gun,) the 15-inch, at 32° elevation, with 100 lbs. "American" powder—we call it "mammoth grain"—projected its shot with an initial velocity of 1,538 feet per second, and to a distance of 7,680 yards, 4½ miles, says: "The gun is probably too short to burn all the powder before the shot leaves the muzzle, and a further increase of charge could not give proportionate velocity." As they proved on their trials, "60 lbs. give 1,170 feet per second (to a 453 lb. ball), and 100 lbs. *only* increase it to 1,538 feet."

Now, if a pound of powder in a given gun always performed the same amount of work, irrespective of the weight of charge, the *vis viva* would vary directly as the weight of the charge; and, consequently, the velocity of the shot as the square roots of the charges. Hence, as 60 lbs. give 1,170 feet to a 453 lbs. ball, a 100 lbs—if each lb. was of same efficacy as first charge—would give 1,511 feet per second; but this charge actually gave "1,538 feet" to the same weight of ball. The remarkable fact is thus shown that the work done per pound (notwithstanding the magnitude of the charge) increased with a charge nearly double the first one. Yet, in the face of this demonstration, which took place right under his nose, the chief of artillery of the *Times* says, "the gun is too short to burn all the powder," and "a farther increase of charge would not give proportionate velocity."

And in order to exhibit still further the strange ignorance of the first principles of gunnery which characterize the writings of this artillery *savant*, it will only be necessary to say that the proportionate space occupied by even a 50 lbs. charge in the bore of their 9-inch pop-gun, is so much *more* than 100 lbs. taken up in the 15-inch, that it shows he has no accurate knowledge of the subject on which he discourses to the whole of Europe through the columns of its "leading journal."

The change in the tone of his last article in the *Times* of September 10, from the gorilla-like shriek of his former one in *Times* of July 27, to use a comparison started by himself, is as different as the terrible roar of the 15-inch is from the tiny tinkle of the 7-pounder rifle fired on the same occasion. We are, by the by, quite anxious to read his account of the penetration of the target on September 26.

There is another point which it may be well for both the chief of artillery of the *Times*, the scientific reporter of the Pall Mall *Gazette*, and the ordnance officer of the *Engineer*, to make note of, and that is that the *vis viva* of their 9-inch "punching" bolt, compared with the atmospheric resistance it encounters, is only about 7 per cent. more than that of the 15-inch sphere.

The scientific reporter of the *Gazette*, in his issue of the 10th inst. says: "The rifled gun (9-inch) can be used in broadside, the smooth bore (15-inch) only in turrets." Is it possible that he does not know that we have a carriage which can handle a 15 or 20-inch whenever a platform can be found strong enough to carry it, broadside or any where else.

It is true we prefer to put them in monitor turrets, where they can be protected by say from 15 to 20-inches of wrought iron, instead of the English system of mounting their 7 and 9-inch guns behind a thin veneering of the same metal.

The ordnance officer of the *Engineer* has made the brilliant discovery that 34° is "the angle at which projectiles are thrown to the greatest distance." The same officer, in order to conceal his chagrin that the 15-inch did not burst after being fired two rounds with 100 lbs. charges at that angle, goes off on a long rigmarole about powder in his issue of 13th inst., leaving the *vis viva* of the shot out of the question! To restate what we have already partially alluded to, we will briefly observe that the big monitor smooth bore, the identical gun installed in our turrets over five years ago, at the commencement of the rebellion, has shown that it can put its shot through any iron-clad in the British navy.

Even if in future trials the Shoeyburyness artillerists succeed in bursting the American gun, it will not materially help their case, as the important fact of the great power of large round shot against armor plates has been fairly established, and there is no difficulty in building a smooth bore gun of 15 inches caliber, to use, say, 150 lbs. charges.

AN IMPORTANT QUESTION.

Is marking patented things with the patent stamp of nearly identical but inferior articles actionable under the act of 1842?

Frequently patentees suppose in cases where their inventions are infringed under color of right by reason of the infringer making use of the date of another and somewhat similar invention, that they have a remedy for the mischief under the 5th sections of the Patent act of 1842. The first clause of that section provides that a person shall not (under a certain penalty) affix upon an article not patented by him, the name of another who has obtained a patent upon such article, without the consent of such patentee; the second clause, that a person shall not affix the word "patent," or "letters patent," or "patentee," or any word or words of like import, with intent of imitating a patentee's device on any unpatented article, or in other words, on an article not covered by any patent whatever, for the purpose of deceiving the public. The first clause is the one enacted for the protection of a patentee under certain circumstances; the second for the protection of the public generally.

The case referred to above does not come within either of these clauses without it can be shown in an action brought that the infringer is wrongfully using the date of the second or similar patented article, as it may be made to appear that he has a license from the second patentee; or is using such mark upon an article unpatented by any person whatever, for the purpose of imposing upon the public, or in other words, deceiving the public by making it think it is getting a patented article when such is not the fact.

The case would be different and clearly within the statute, were the infringer using the name of the patentee who prosecutes in the action, or date of his patent, without his consent, or using his date of patent upon an article not patented by any person, with intent to deceive the public, as before explained. The only way of reaching such fraud so far given by our legislators is by proceeding as in cases of common infringement.

INDUSTRIAL EDUCATION—WHAT A LIBERAL MANAGER HAS ACCOMPLISHED.

The education of the families of skilled artizans is a subject which philanthropists and political economists never tire of writing about—in fact, we know of no subject in the educational line about which more has been said and less accomplished than this. This is almost, if not wholly due to the narrow-mindedness, illiberality, and, we may add, not a little to the stinginess of employers. What can be accomplished in this direction, by the energy and liberal-mindedness of a single individual, is very strikingly shown by the success which has attended the efforts of M. Schneider, manager, and we believe, the proprietor, also, of the immense iron works at Creusot (department of Saone et Loire), France.

These works are of great magnitude, as will be seen by the following description, taken from the Pall Mall *Gazette*:

Creusot may be said to form a kind of model manufacturing community, all placed under the direction of a single individual or firm, and consisting of 24,000 inhabitants.

The number of workmen employed is 9,950; the steam power is equal to that of 9,750 horses. There are coal mines, which produce 250,000 tuns annually. There are iron mines, which produce 250,000 tuns of minerals per annum; and the annual production of cast iron is 130,000 tuns. But it is not in the mere production of raw material that this company expends its skill. It converts its cast iron into all the forms of wrought iron employed in the manufacture of machinery, or in the construction of large engineering works. In the course of the year it turns out 100 locomotives, or about two a week. Although situated far inland, with no direct temptation to undertake naval engineering, it exhibits numerous examples of marine steam engines (one of 950 horse power nominal—upward of 5,000 actual) for the iron-clad ships of the French navy.

It seems, that, from their earliest childhood, the children

boys and girls, of the workmen at this immense establishment, are educated and trained in schools organized by M. Schneider. So far from the education which they receive putting the workman above his work, the contrary is the case; it enables him to do it more to the satisfaction of his employer, and to his own honor, and better for his own personal advancement.

The system of the instruction given at the Creusot schools is fully detailed in tables hanging on the walls of the Great Exhibition; drawings of the habitations of the workmen, their churches, their hospitals, and their schools, are also exhibited.

"Statistical tables illustrate the progress and changes of the population; these are divided into two parts—the one showing the progress of their material welfare, their accumulation of property, and their consumption of food and luxuries; the other showing the amount of attendance at schools, the relative statistics of individual success in these schools, and the subsequent rank attained by each pupil in the manufactories. From these we gather that the progress of education has always been followed by improved moral character and advanced social being; that the pupils who have most successfully availed themselves of the technical schools are those who have afterward risen to the highest ranks as foremen, clerks, superintendents, overseers and engineers, in the works themselves."

These tables also show "the organization of the schools, the programme of subjects taught, distribution of pupils' time, samples of their mechanical and mathematical drawings, samples of their hand and eye sketches, examples of writing and French composition, lists of their studies in religion, sacred history, French history and geography; studies in arithmetic, algebra, elementary geometry, and descriptive geometry; specimens of ornamental writing and map drawing. These are for the boys. But the girls also are well educated, with the difference that for plain drawing and geometry are substituted needle-work and dress-making. They are also taught book-keeping." It was remarked this education—fully equal to that taught in most of our high schools—does not put the workman above his work; and the magnificent display in almost any branch of heavy iron and steel manufacture placed by the Creusot works in the Exhibition, is as finely finished, both as regards accuracy and beauty of finish, as it is possible to make iron and steel. Fully equal to that of the most ignorant and dextrous of the English workmen.

It has been intimated on more than one occasion, by a prominent political economist of this country, that it would not harmonize with the "American idea" for employers to manifest any interest in the welfare and advancement of their employés. We believe this to be ridiculous fallacy.

No doubt American mechanics will strongly object to be ostentatiously *patronized* by that spirit of vanity which is so often illustrated in founding educational and theological establishments, so as to afford a prominent place to display the name of the founder. But an employer who cannot manifest an interest in the welfare of those employed by him, and those depending on them, without offending that proper pride which belongs to any man who is good for anything, by ostentatiously patting them on the back, and doing good with a loud blowing of horns, shows at once that he is a mean fellow—even more stingy, in reality, than one who makes no pretensions.

The moment a man becomes an employer he assumes duties which it is wicked to shrink from; duties scarcely less sacred than those due from parents to children. It is quite unnecessary to enlarge on these obligations, any one who cannot hide behind a three cent piece will appreciate them just as thoroughly as though they were placed before him in the largest type.

Where you find a man with a keen scent for gratitude, it is a pretty safe rule to set him down as "small potatoes, and few in a hill." To do good, to advance the welfare of others, to add to their happiness, is all the reward a noble nature cares for; and this seems to be the spirit which moves the manager of the Creusot Works.

If one cannot attempt to add to the means of enjoyment of others, without the accompanyment of a brass band, he had better, a good deal, not make the attempt at all.

THE TWENTY-EIGHTH STREET BOILER EXPLOSION.

This catastrophe which occurred Sept. 9th was so remarkable that it has attracted the attention of engineers and practical men throughout the country. The public, generally, have also read the details with great interest. The statements, however, which have appeared in some of the news journals have been so inaccurate and confused that we deem it well to publish the facts as they could be ascertained by personal inspection. This boiler, which was eight feet diameter at the bottom, six feet at the top, and fourteen feet and six inches high, and weighing five tuns, exploded about 4 P. M. on the 9th of September, at 258 West 28th street, ascending into the air nearly vertically, with a slight westerly inclination, described by those who saw it as appearing about the size of a nail keg, and falling into the rear part of the dwelling house 308 West 28th street, a distance horizontally of about 450 feet. Two persons were killed where the explosion occurred—the engineer and fireman; and two children of Mr. Houseman, by its descent through his dwelling, and several others were injured.

This boiler was new, having been in use less than two months and a half, was built by Densmore & Black, of this city, and was of the style known as the Densmore boiler, which has an excellent reputation in different parts of the country. It was illustrated and described on the first page of No. 23, Vol. XVI. Scientific American. It was tested by hydrostatic pressure to 115 pounds to the square inch. The iron is pronounced of good quality by all practical iron men. The man who has since bought it and cut it up, says it is the best iron he ever found in a boiler. All agree that the boiler was well made. These boilers, of the same size as this, have been tested both by the Metropolitan police inspectors and the steamboat inspectors, to 120 pounds to the square inch, and received their certificate to carry 80 pounds pressure of steam, and have carried that pressure for years. Many of them are now running, carrying 90 and 100 pounds to the square inch.

It was intended to carry 60 pounds pressure to the square inch on this boiler, and the safety valve was supposed to be set to blow off freely at that pressure. It had two steam gages—one in the fire room and one in the engine room. It did its work very easily, running all the time with the damper nearly closed and much of the time with the fire door open. On the afternoon of the explosion it was not doing more than about half its ordinary work. The engine was running at the time of the explosion and had not been stopped. The boiler had never been known to foam any after the first two days, and it was working to the delight and admiration of the owner and scores of practical steam men who visited it.

The lower portion of the boiler stood in a vault, the arch over the vault coming up a little below midway of the boiler, there being about two inches space between the boiler and arch all around. The fire room was below the arch, and the engine room was above and at one end of it, and the gage cocks and water glass gage were above the arch on the back side of the boiler where the fireman could not see them when at his duties, it being intended that the engineer should have sole charge of the water. This was an arrangement of the engineer himself. It should be borne in mind that the same engineer and fireman had run there, for about four years, three horizontal boilers placed in this vault—the fireman having charge of the fire and water, and the engineer charge of the engine and the machinery generally through the establishment. The boiler stood upon cast-iron legs that raised the bottom of it sixteen inches from the fire-room floor, which space was open on the front side half way around the boiler and stopped up on the rear side with a four inch brick wall laid up under the edge of the boiler. The fire grates were about 20 inches above the floor of the fire room, and the fire-box in the boiler was about 7 feet 4 inches high above the grate and contained about 180 square feet of heating surface of the most effective kind, the heat acting with nearly equal force upon every part of it. From the top of the fire-box the heat was conducted down to the bottom of the boiler through 135 tubes, 6 feet long and 2¼ inches outside diameter, and was conducted directly from the bottom of the boiler to the chimney, and the outside of the boiler was covered with hair felt all over to the very bottom.

The cylinder containing the tubes was 4 feet diameter and 6 feet long, hence would contain, without any tubes, 90 cubic feet of water,. The tubes would displace 27½ cubic feet, leaving the water contents of the tube cylinder 62½ cubic feet, or more than two thirds as much as it would be if it had no tubes in it. The water spaces between the tubes and the shell would average about six inches thick. The water spaces around the fire-box were nowhere less than four inches thick, and would average full six inches and a half thick. The gage cocks were set to carry from fifteen to twenty inches depth of water on the crown sheet. In regular working order it carried over 1,300 gallons of water, or about 21 hogsheads, about one cubic foot to every four feet and a half of heating surface. The ordinary run of stationary tubular boilers carry one cubic foot of water to from five and a half to seven square feet of heating surface; railroad locomotive boilers, a cubic foot of water to from eight to eleven feet of heating surface; and steam fire engines a cubic foot of water to from thirty to thirty-two feet of heating surface.

The evaporating power of this boiler, as near as we can arrive at it, was about 470 gallons per hour. The quantity of water on the crown sheet about 315 gallons, as designed to be worked, hence it would take forty minutes to uncover the crown sheet, and about twenty minutes more to get the water down to the upper tube head, which would have to occur before the tubes could heat.

The upper ends of the tubes and all the upper portion of the fire box showed unmistakable evidence of having been over-heated. The lower tube head blew out taking the tubes with it, the head and most of the tubes remaining where the boiler stood, the tubes first coming out of the upper head. There were 135 two-and-a-half-inch tubes equally distributed over a fifty-two-inch head well expanded with good projections on each end outside of the heads, and if not over-heated would not have yielded at three times the pressure that other portions of the boiler was able to withstand.

THE MACHINIST'S APPRENTICE.

Several communications asking information in regard to the trade of the machinist have been received. If we reply to one the answer will comprehend the inquiries of the others.

A correspondent from Iowa wishes to enter as an apprentice, a shop where locomotive and other engines, and machinist's tools are manufactured, or, at least, where engines are built, and desires replies to the following questions: "Can you recommend some such establishment where I could get in or you think I could? What is the period and what the terms of an apprenticeship? I wish a situation where the best of work is done and an opportunity is afforded the apprentice of becoming a thorough workman."

The time was—twenty-five or thirty years ago—when the position of apprentice to the machinist trade was easily obtainable and the remuneration was sufficient to support the apprentice. It is not so now. To enter a good shop as an apprentice requires in most cases influence and the position is granted as a favor. The amount paid is rarely more than enough to liquidate board bills, if it is even so much, and the time required from three to five years. There are adequate reasons for this change. The apprentice must be furnished with good and valuable tools and his work is of as high a character as his increasing capabilities will warrant, not only for the purpose of advancing his interests but for the benefit of his employer. It is not surprising, therefore, that the first year or so of his apprenticeship proves, from breaking of tools and spoiling of jobs, unprofitable to the proprietor.

Again, there is no adequate means to compel an apprentice to fulfill his contract with his employer. He may, soon as he deems himself competent to do work which brings higher pay, leave his shop and go elsewhere. Consequently, master machinists prefer to employ ordinary laborers for their rougher work and journeymen for the better quality. Under these circumstances we do not know how to advise you.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING OCTOBER 1, 1867.

Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

69,298.—Foot Rest.—Calvin Adams, Pittsburgh, Pa.

I claim constructing a foot rest with the base, A, of suitable diameter for its support, and the rest, B, of convenient shape to form a rest for the foot, connected by one or more columns, C C, substantially as shown and described.

69,299.—Fence.—G. W. Adams, Rochester, N. Y.

I claim the arrangement of the metallic stakes, P, double bracing wire, f, in connection with the bed plate, C, and the rails, R, of the fence, substantially in the manner herein shown and described and for the purposes set forth.

69,300.—Broom Head.—E. A. Alexander and H. C. Kellogg, Independence, Iowa.

I claim the employment of slotted bar, b, when arranged in combination with hooks, d d, loop, c, and handle or screw rod, a, in the manner and for the purpose set forth.

69,301.—Corn Planter.—Thomas Allen, Arrow Rock, Mo., assignor to himself, Joseph Nicholson, Arrow Rock, and A. B. Garrison, St. Louis, Mo.

I claim the arrangement of the furrow plow, B, coverers, k k1, side boards, O O1, rolling wheel, D, slide valve, d, worked with a lever, E, or automatically, the adjustable cams or pins, p, on the rolling wheel, all in combination, when constructed and arranged substantially as shown and specified.

69,302.—Clothes Dryer.—Israel B. Arnold (assignor to C. P. Dunham), Providence, R. I.

I claim the improved folding clotheshorse, as composed of a central post, A, the series of posts, B B B B, their several connection bars, C C C, the catch plates, D, and screws, e, arranged and applied together substantially in manner and so as to operate as set forth.

69,303.—Machine for Making Socketed Reed Plates.—Chas. Austin, Concord, N. H.

I claim the combination as well as the arrangement of the guides, D1 D1, the endless carrier, B, the presser, I, the rotary cutter, F, the vibratory frame G, and the adjustable cam, H, as described, the said cutter, F, carrier, B, and cam, H, being provided with mechanism for operating them, substantially as described.

I also claim the combination as well as the arrangement of the hopper, E, the guides, D1 D1, the endless carrier, B, the presser, I, the rotary cutter, F, the vibratory frame, G, and the adjustable cam, H, as described, they being provided with mechanism for operating the carrier, the cutter, and the cam, as explained.

I also claim the adjustable cam, H, made substantially as described.

I also claim the combination as well as the arrangement of two or any other suitable number of edge cutters, L L, and one or more pressers, I K, with the endless carrier, B, the guides, D1 D1, the rotary cutter, F, the vibratory frame, G, and the adjustable cam, H, or the same and the hopper, E, the whole being to operate together, and provided with mechanism for actuating the carrier, the cutter, and the cam, substantially as herein before explained.

I also claim the combination as well as the arrangement of the two endless carriers, B M, one or more side trimmers or plane irons, U, the guides, D1 D1 R R, the reverser, S, the cutter, F, the vibratory frame, G, and the adjustable cam, H, the carriers, cutter, and cam being provided with operative mechanism, substantially as described.

I also claim the combination as well as the arrangement of one or more smoothers, V, one or more finishers, W, the plane iron, U, the reverser, S, the endless carriers, B M, the guides, D1 D1, R R, the cutter, F, the vibratory frame, G, and the adjustable cam, H, the whole being provided with mechanism for operating the carriers, the cutter, and cam, substantially as described.

I also claim the combination as well as the arrangement of the hopper, E, the guides, D1 D1, the carrier, B, one or more pressers, I K, the rotary cutter F, the vibratory frame, G, the edge cutters, L L, the reverser, S, the guides, R R, the carrier, M, the face cutter, U, or the latter and the presser, I, also, their combination as well as their arrangement with one or more smoothers, V, or one or more finishers, W, the camers and cam and rotary cutter being provided with mechanism for operating them, substantially as hereinbefore specified.

69,304.—Wardrobe Bedstead.—William R. Bagnall, Chelsea, Mass.

I claim a hinged oblong bed-frame arranged to swing laterally from a case, as and for the purpose described.

I claim a swinging bed frame, combined with a surmounted wardrobe or bureau, or both, substantially as described.

I claim a wardrobe or bureau, or both combined with a swinging bed frame having head and foot pieces swinging inwards, as and for the purpose described.

69,305.—Carriage-shaft Coupling.—Jesse P. Barrick, Massilon, Ohio.

I claim the pivoted or hinged stop, J, and spring, I, arranged in relation to the coupling, in the manner and for the purpose substantially as set forth.

69,306.—Carriage Button.—W. P. Bateman (assignor to himself and N. F. Mathewson), Barrington, R. I.

I claim a carriage button, as constructed, with the head eccentric to the body, and with a journal to project from the head, and with a screw and a prismatic base to its body, as described.

I also claim the carriage burton, as not only made with the head eccentric to the body, and applied thereto by means of a journal so as to be capable of being revolved relatively to it as specified, but as having a prismatic base, and a screw to project therefrom, as explained.

69,307.—Machine for Making Wagon Wheels.—Alonzo Beswick, Paris Richardson, Jr., and John W. Brown, Kelley, Ill.

We claim the combination and arrangement of the cross bar, C, and movable bar, E, with the guide bars, H H, operating in the manner and for the purposes set forth.

We also claim the auger frame, W, in combination with the screw, M, and guide bar, H, operating substantially as described and for the purposes stated.

69,308.—Brick Machine.—Peter E. Bland, St. Louis, Mo.

1st, I claim the combination of movable plattens or followers, b, in a mold-bearing cylinder, B, revolving about a fixed central shaft, H, with one or more fixed cams, k, upon said shaft, all substantially in the manner and for the purpose herein set forth.

2d, The combination of compressing plates, or plungers, G, with a revolving mold-bearing cylinder, B, when said compressing plungers have the within-described reciprocating movements, and operate in unison with an intermittent movement of said cylinder, substantially as and for the purpose herein set forth.

3d, The combination of pistons, g, or their equivalents, with a revolving mold-bearing cylinder, B, and radial cam-actuated followers, b, in the molds thereof, when said pistons, g, have substantially the within-described reciprocating movements, for the purpose herein specified.

4th, The combination of a ratchet wheel, W, or other equivalent device, with the hollow shaft of a mold-bearing cylinder, encircling a fixed central shaft, H, all substantially in the manner and for the purpose herein set forth.

5th, The combination of a rocking shaft, j, and pawl levers, w w, with pins or catches, i i, on the revolving mold-bearing cylinder of a brick machine and with ratchet bars, l l, on a receiving car running beneath said cylinder for the purpose of imparting an intermitting forward movement to the car in unison with the intermittent revolution of the cylinder, all substantially in the manner and for the purpose herein set forth.

6th, The combination of inclined bars, r, with the frame of my improved brick machine, and with the coupling hooks or catches, o, of the cars running through the same, for the purpose of automatically disconnecting the cars in their forward movement, substantially as herein set forth.

7th, The combination of a stationary transver e sweep bar, n, with a revolving mold-bearing cylinder, B, and movable followers, b, therein, to effect a detachment of the molded material from the face of said followers after its discharge from the mold, substantially in the manner herein specified.

8th, The combination of detachable mold frames, F, with a grooved or suitably framed revolving mold-bearing cylinder, B, substantially in the manner and for the purpose herein set forth.

9th, The combination of any suitable packing material with the re-adjusting pins or pistons, gi, of a rotary cylinder brick machine for the purpose of lubricating or dampening the sides of the mold therein, substantially as herein set forth.

10th, The combination of an adjusting plate, J, with the end of a fixed central cam shaft, H, passing centrally through the mold-bearing cylinder, B, of a revolving cylinder brick machine, substantially in the manner and for the purpose herein set forth.

69,309.—MACHINE FOR WEAVING BASKETS.—F. H. Brown (assignor to himself, E. F. Peugeot, and H. Flersheim), Chicago, Ill.

1st, I claim a skeleton basket form, as and for the purpose set forth.

2d, The packing and forming device, F, or its equivalent, as and for the purposes specified.

3d, The guide-piece, M, constructed and operating as and for the purposes specified.

4th, Cam, Z, in combination with the band, X, as and for the purposes specified.

5th, The flexible teeth, T, of the controlling band, as and for the purposes set forth.

6th, The holder, S, in combination with rod, I, and cam, Z, as and for the purposes set forth.

7th, The cam, G, in combination with the screw, C, as shown, and for the purposes specified.

8th, The slide, etc., in combination with the packing and forming device, F, as and for the purposes set forth.

9th, In a basket machine, the oscillating standard, d, in combination with the weaving device, as and for the purposes specified.

69,310.—CANE STRIPPER.—J. C. Brown, Crawfordsville, Ind.

I claim the cane stripper and cane cutter, herein described, when the same is considered as a whole device, and constructed in its said several, parts as aforesaid, and used for the purpose and in the manner substantially as set forth.

69,311.—HAT AND COAT RACK.—T. W. Brown, N. Y. City.

I claim the arrangement of the lower curved or coat prong so as to stand obliquely with the larger, upper, or hat prong, and the fastening plate, substantially in manner as described.

I also claim the tri-pronged hook as made with the hat prong and the two coat prongs, and with these latter arranged obliquely with respect to the fastening plate and such hat prong, and to project in opposite directions relatively to the latter, the whole being substantially as described and represented.

69,312.—MODE OF EMBALMING OR PRESERVING ANIMAL SUBSTANCES.—L. Brunetti, Rovigno, Italy.

I claim the method of and means for embalming or preserving animal substances from decay, substantially as herein set forth and described.

69,313.—WOOD-BENDING MACHINE.—D. Catchpole, Geneva, and J. Havens, Auburn, N. Y.

1st, We claim the arrangement of the sliding bed, Di, lever, j, rod, r, presser head, e, former block, B, and its clamps, and the wheel, W, substantially in the manner and for the purposes shown and described.

2d, The levers, G, former, rotating head, Q, and former, F, arranged and operating substantially in the manner shown and described, for the purpose of giving the vertical and lateral bends at the same time, as set forth.

3d, The arrangement of the levers, G, pivoted to the sliding bed, D, in combination with the rollers, R, attached to the bed, D, as and for the purposes specified.

69,314.—CULTIVATOR.—Nathan A. Cates, Thorndike, Me.

1st, I claim the combination of the central beam, carrying the adjustable roller, the colter and the scraper, with the laterally adjustable beams, carrying the ridging and smoothing plows, the combination being and operating substantially as described for the purposes set forth.

2d, The combination with the scrapers of the laterally adjustable plows, all constructed and arranged for joint operation, as described.

3d, The laterally adjustable furrow-turning and ridge-smoothing plows, constructed and operating as described.

4th, The combination with the central beam and colter, of the clevis bracket and adjustable yoke carrying the leading roller, all constructed, arranged and operating as described.

69,315.—ARCHITECTURAL PORCELAIN.—W. J. Cheyney, Wallingford, and E. F. Dietericks, Philadelphia, Pa. Antedated September 20, 1867.

We claim, as a new article of manufacture, architectural porcelain, composed of cryolite, or its chemical equivalents, in combination with silicia and a metallic oxide, or an alkali, or both, pressed and cast in molds, and pressed or rolled as above set forth.

69,316.—PLATE PORCELAIN.—Waldron J. Cheyney, Wallingford, and E. F. Dietericks, Philadelphia, Pa. Antedated Sept. 20, 1867.

We claim, as a new article of manufacture, plate porcelain, composed of cryolite or its chemical equivalents, and silica alone, or cryolite, or its chemical equivalents, in combination with silica and a metallic oxide, or an alkali, or both, fused and cast on a table, and rolled or blown into cylinders, and cut and flattened, as above described.

69,317.—MANUFACTURE OF DRESS TRIMMINGS.—Waldron J. Cheyney, Wallingford, and E. F. Dietericks, Philadelphia, Pa.

We claim, as a new manufacture, bugles, beads, or buttons, made of cryolite, or its chemical equivalents, fused with silica, worked substantially in the manner and for the purpose described.

69,318.—ENAMEL TO BE APPLIED TO METALS, EARTHENWARE, ARTIFICIAL STONE, ETC.—W. J. Cheyney, Wallingford, and E. F. Dietericks, Philadelphia, Pa. Antedated Sept. 19, 1867.

We claim, as a new manufacture, an enamel composed of cryolite, or its chemical equivalents, and silica fused together, substantially as above set forth.

69,319.—PICKER STAVE FOR LOOMS.—Richard Collins, Chicopee, Mass. Antedated Sept. 14, 1867.

I claim the combination of the cam, c, with the lever, a, and plate, d, substantially as and for the purpose described.

69,320.—LOOM.—Jessie D. Cottrell, and George Draper, Milford, Mass.

1st, We claim the combination of the "let off" mechanism, two yarn beams, and a friction and equalizing apparatus, substantially as described.

2d, The "let off" mechanism, made and arranged with the friction equalizing apparatus, substantially as described.

3d, Our improved arrangement of the two yarn beams, and the equalizing and friction apparatus substantially as described, the two beams under such an arrangement being placed close together, and the equalizing and friction apparatus being arranged outside of, rather than between them, as explained.

4th, We also claim our improved friction and equalizing apparatus, or mechanism, substantially as described.

5th, We also claim the arrangement of the gears, o r r m, and l, constituting the "compound motion."

69,321.—STEP AND EXTENSION LADDER.—H. W. Covert, Rochester, N. Y.

I claim, as a new article of manufacture, the combined step and extension ladder, A B, having combined and arranged therewith, both lateral and rear braces, D C, in such a manner as to expand and brace when used as a step ladder, but fold compactly when used as an extension ladder, as herein set forth.

69,322.—HARVESTER RAKE.—M. Crossman, Marengo, and P. A. Spicer, Marshall, Mich.

1st, We claim the mode of suspending and tripping a series of revolving rakes or reels, and attached vibrating arms, by the use of an inclined trackway, H, in combination with the traversing roller, R, abutting pins, P, hinged abutments, J, and tripping cam, K, connected, arranged, and operated substantially as herein described.

2d, Changing the hight of the plane of rotation, in rakes or reels, when so suspended by the employment of stepped faces, I, on the hinged abutment, J, in combination with the guide lever, L, as set forth.

3d, Preserving the parallelism of the rake with the vibrating arm, and with the platform of the machine, by overbalancing and stopping said rake, and connecting it with its revolving central cap by the combined arrangement of the bracket arm, M, rod, N, tink, O, and stop ears, S, substantially in the manner herein specified.

69,323.—COUPLING PLOWS TO WHEELED CARRIAGES.—Marshall S. Curtiss, Bradford, Ill.

1st, I claim the curved and slotted arm, C, its form and manner of adjustment between the ears, I, combined with the plow beam, B, substantially as and for the purpose set forth.

2d, The forward guide, Q, combined with arm sockets, N, arranged to allow the forward end of the plow beam, B, to have a lateral and vertical motion, substantially as set forth.

3d, The arrangement of the seat, F, in front of the crank axle, E, combined with lever, D, the whole being arranged to set plow, B, in the ground, or lift it out of the ground, as described and set forth.

69,324.—CHURN.—William Davis, Arrow Rock, Mo.

I claim the disks, D, shaft, a, diamond-shaped beaters, D' gears, a' b', and spring, B, in combination with the case, A A1, and the parts being constructed, combined, and arranged, as and for the purpose specified.

69,325.—GLASS WARE PRESS.—H. Dillaway, Sandwich, Mass.

I claim the combination of the driving segment gear and pinion, with the respective pinion and segment gear with which each alternately connects when arranged to operate to produce the descent of the plunger or piston, substantially as shown and described.

Also, Combining the follower with mechanism, which not only effects its descent, but holds it stationary upon the mold during the continued descent of the plunger, substantially as described.

69,326.—CLUTCH FOR SUSPENDING HAY FORKS.—Wm. Dixon, and L. Heath (assignors to themselves and T. P. Saunders), Adams, N. Y.

We claim, 1st, The combination of the arms, A A1, spurs, J J, stock or frame, D d, pulleys, B b, cord or flexible connection, C, and springs, L L, substantially as and for the purpose specified.

2d, The combination with the above of the clasp, I, staff, h, latch or ratchet bar, F, catch, M, and spring, G, arranged and operating in the manner and for the purpose set forth.

3d, The combination of the arms, A A1, pulleys, B b K, stock, D d, cord, C, ring, E, latch, F, spring, G, staff, h, and clasp, I, the whole constructed and operating in the manner and for the purpose explained.

69,327.—ADJUSTABLE FRAME FOR STRETCHING HIDES.—William Dunn, Newark, N. J.

I claim the application of movable planks to a stationary frame, in the manner set forth, and worked by levers, as shown, the planks divided in the middle, and connected by a hinge, or each plank in one continuous piece, and working independently of each other, thus adjusting itself to the formation of the hide, and stretching each part to its fullest capacity.

69,328.—CENTRIFUGAL APPARATUS FOR WASHING SUGAR.—George E. Evans, Boston, Mass.

I claim, 1st, The movable inner circular cylinder, or partition, B, in centrifugal sugar machines, either with or without foraminations, the same being capable of being attached without alteration of the centrifugal tub by means of a conical or cylindrical socket, fitting upon a central conical or cylindrical shaft, substantially as described.

2d, Constructing the inner cylindrical partition, B, in centrifugal sugar machines of sheet metal, or any equivalent material, without foraminations or interstices, substantially as described.

3d, Operating the inner cylindrical partition, B, when made without foraminations, to make a wall of sugar by lifting the same after the rotation of the centrifugal has commenced.

69,329.—SELF-ADJUSTING LID SUPPORT FOR PIANOS, DESKS, ETC.—Charles T. Faber, New York city.

I claim the adjuster for bridging the notch or stop which holds the prop or support for the lids of pianos, desks, and other similar articles of furniture, made automatic in its action by means substantially as described.

69,330.—RAILWAY TRUCK.—H. B. Fernald, Dedham, Mass.

I claim, 1st, The circular truck, T, constructed as described, with hangers cast or fitted upon it, and extending above and below, substantially as set forth.

2d, In combination with the above, the guides, I I, the convex wheel, E, and the drive wheel, D, constructed and arranged as set forth.

3d, The truck, V, with the hangers extending above and below, and provided with slotted openings for the wheels, O O, a traverse opening to admit the axle, and a central circular opening in combination with the guides, L L, substantially as described and set forth.

69,331.—COMPOSITION OF MATTER FOR FILLING SAFES, AND FOR OTHER PURPOSES.—Samuel T. Fowler, Brooklyn, N. Y.

I claim the use of saw dust, or its substitute, for this purpose, in combination with any one or more of the plastic materials herein described, for the purpose specified.

69,332.—HORSE RAKE.—Samuel Freet, Upper Strasburg, Pa.

I claim the combination of the double acting lever, A, and the roller, B with hooks, c c, the lever being attached to the roller, B, which is attached or fixed on the ends of the shafts, B, having in it two hooks, c c, to hold down the teeth when raking heavy hay, or heaping the same.

69,333.—MAKING CARRIAGE BOLTS.—Samuel Frisbie and Andrew S. Upson, Farmington, Ct.

We claim the method substantially as herein described of making bolts with heads and square necks, such method consisting in enlarging or swelling that part of the rod which is to form the neck, and at the same operation forming a rudimentary or preliminary head thereon, and subsequently forming the square neck by squeezing, and the finished head by compression, the whole mode of manufacture being substantially as described.

69,334.—SHOEMAKER'S BENCH.—Benedict Gantner (assignor to himself and John Sporre), Tell city, Ind.

I claim, 1st, The combination of the treadle, C, strap, D, drum, a, and straps, e h, substantially as and for the purpose described.

2d, The combination of the treadle, C', strap, D', pawl, b, and ratchet, a', or their equivalents, substantially as and for the purpose specified.

3d, In combination with the elements of the above claims, I claim the clamp E, constructed as described, for the purpose set forth.

4th, The spring, e, in combination with the bar, d, cross head, f, and straps, e h, substantially as and for the purpose specified.

5th, The friction device, k k l, in combination with the groove, j, arranged and operating substantially as described.

6th, The dovetailed key, l, in combination with the groove, gi, and shoulder, B2, substantially as and for the purpose set forth.

7th, The rollers, m, in combination with the shoulder, B2, for the purpose specified.

8th, The removable cushion, G, and anvil, F, adapted to be applied substantially as described, for the purpose specified.

69,335.—THREE WHEEL CARRIAGE.—John Gehr, Mercersburg, Pa.

I claim, 1st, The ring, B, working in the groove, a1, of the wheel, A, and having the projections, b1 b1, substantially as and for the purpose specified.

2d, The spring, D, bent in the form shown, attached to the wheel, A, by the bolts, d d, and baring the carriage at d1, substantially as and for the purpose described.

3d, The metallic guard, substantially as and for the purpose specified.

69,336.—GATE.—Riley James Gilbert, Hanover, Wis.

I claim, 1st, The inclined ways, G and H, when constructed with ascending and descending inclines, and used to guide and support separately the ends of a gate, substantially as described.

2d, Operating a gate, having its ends separately supported on two parallel double inclined ways by means of the handles, E, and cord, D, the latter being provided with a stop, f, in such a manner that the gate is operated by the cord, together with its own momentum and gravity, substantially as described.

69,337.—FARM GATE.—Newton J. Glover, Waveland, Ind.

I claim the double flanged roller, B, the pieces, A E H I P, and the brace N, in combination, substantially as described and set forth.

69,338.—MACHINE FOR CUTTING ICE INTO BLOCKS FOR STORING.—George B. Gruman, Ridgefield, Ct.

I claim the arrangement of the revolving circular saw, C, adjusting frame, B, lever, D, in combination with the other attachments, in the manner herein described, and for the purpose set forth.

69,339.—POTATO DIGGER AND WEEDER.—George W. Hall, Triangle, N. Y.

I claim, 1st, A spade or spading fork, having a pivoted fulcrum or rest provided with a swivel joint, substantially as and for the purpose set forth.

2d, A spade or spading fork, having a pivoted fulcrum or rest where the said fulcrum is adjustable on the handle of the spade or fork, and of adjustable length, substantially as described.

3d, A spade or spading fork, constructed as described, viz., with an adjustable, pivoted swiveling fulcrum, as and for the purposes set forth.

69,340.—DOUBLE ROTARY HARROW.—George W. Hall, New Haven, Mich.

I claim the combination of the bent rim, a, having teeth therein, sleaves, s s, and x x, center pin, c, and cross bar, i, all constructed and arranged as and for the purposes described.

69,341.—DEVICE FOR PREVENTING HORSES FROM CRIBBING.—G. G. Hickman (assignor to himself, Francis H. Wright, and John Criswell), Coatesville, Pa.

I claim the combination of the rubber part, or shield, A, with the prong, B, substantially as and for the purpose specified.

69,342.—HARVESTER.—Anthony Hilts, Jr., Springdale, O.

I claim the quadrantal plate, C, when provided with stop, s, and perforations, i i, in combination with bar, E, and tongue, A, operating in the manner and for the purpose described.

69,343.—MUSKETO FRAME FOR WINDOWS.—Augustine E. Horton, North Leominster, Mass.

I claim the musketo shade as composed of the main and auxiliary rectangular musekto netting covered frames, A C, and the cross bar, B, arranged and hinged together as specified.

69,344.—SADIRON.—Arthur Y. Hubbell, Elmira, N. Y.

I claim the employment of a non-conducting substance, in combination with the parts, A B, constructed and arranged substantially in the manner and for the purpose set forth.

69,345.—PUDDLING AND OTHER FURNACE.—William Jeffries, West Bromwich, Eng. Patented in England, January 26, 1866.

1st, I claim the improvements in pudding furnaces and heating furnaces, and other reverberating furnaces used in the manufacture of iron and steel hereinbefore described, and illustrated in the accompanying drawing, that is to say, constructing the beds of the said furnaces, substantially in the manner hereinbefore described and illustrated, whereby the whole or nearly the whole of the plates used in ordinary furnaces are dispensed with, and great economy, both in the cost of keeping the furnaces in repair and in the saving of time consequent upon the furnaces working a long time without requiring repair, is obtained.

2d, Manufacturing a settling for lining settling, or repairing reveberatory furnaces, by tapping or running liquid mill or other cinder into molds, so as thereby to form bricks or blocks, which bricks or blocks are used to line settle, or repair the bottoms of reveberatory furnaces, instead of settling the said furnaces with red ore, pottery mine, and tap cinder, calcined and ground as is usual.

69,346.—STRAWBERRY RIPENER.—C. Jillson, Worcester, Mass.

1st, I claim a strawberry ripener made of glass, to be used substantially as and for the purpose set forth.

2d, A strawberry ripener for supporting the fruit, and preventing the runners taking root about the stem of the plant, substantially as set forth.

69,347.—SADIRON HEATER.—James J. Johnston, Alleghany city, Pa.

I claim the grated heater, f, when the bottom of same is corrugated, and used in combination with the box or body, A, of a box iron, whose inner face is corrugated, substantially as herein described, and for the purpose set forth.

69,348.—MODE OF TREATING SLAGS AND CINDERS FOR THE MANUFACTURE OF IRON.—Rudolph Keck, Clintonville, N. Y.

I claim the within described process of reducing slags and cinders directly into wrought iron by subjecting them after they have been pulverized to the action of a separating apparatus and reducing the residuum in a puddling furnace or blooming fire, as set forth.

69,349.—CLOTHES DRYER.—Henry N. King and Austin G. Mason, Adrian, Mich.

We claim the construction and use of the four bents, a e, b f, c g, and d h, the four slats, S S S S, and the brace, B, the whole constructed and operating substantially in the manner and for the purpose set forth.

69,350.—AXLE.—S. D. Littlefield (assignor to himself and Horatio D. Knight), Burlington, Wis.

1st, I claim the beveled flanges, e ei, for covering the collar, E, and the nut, D, and protecting them from grit and sand, substantially as specified.

2d, The projections or lugs, x x1, for stationing the collars, d d, temporarily upon the skein, substantially as set forth.

69,351.—POULTRY DRINKING FOUNTAIN.—George H. Lomay, Somerville, assignor to himself and Richard D. Blinn, Lexington, Mass.

I claim the combination and arrangement of the filling opening, e, and the recess, d, with the reservoir, B, and the trough, A, such reservoir being provided with a discharge opening, b, arranged as specified.

I also claim the construction of the poultry drinking fountain with flat top to the reservoir, in combination with the filling orifice, e, or the same and the recess, d, arranged in the bottom, as set forth.

69,352.—CLOD FENDER.—John Lowe, Lebanon, Ind.

I claim the device herein described, when the same is constructed in its said several parts in manner and form as aforesaid and used for the purpose and in the manner and form substantially as set forth.

69,353.—HORSE HAY FORK.—Joshua M. Mansfield, Watertown, N. Y.

1st, I claim the separately-pivoted curved links, C, in combination with the sliding bar, D, and hinged tines, B B, arranged and operating substantially as and for the purpose described.

2d, The eccentrically pivoted cam lever, F, in combination with the spring catch, E e, and rope, G, arranged and operating as and for the purpose specified.

3d, The arrangement of the arm, A' a, rope, G, and cam lever, F, substantially as set forth.

69,354.—WAGON SPRING.—James McDuffie, Heller's Corners, Ind.

I claim the spring, A, in combination with the gibs and keys, B, and the bar, C, said springs and bar being constructed in the manner and for the purposes herein described and set forth.

69,355.—COOKING STOVE.—Matthias Mead, Lowell, Mass.

I claim the arrangement of the ducts, f f, for conveying heated air through the bottom of the oven and distributing it through the discharge pipes, F F, substantially for the purpose described and set forth.

69,356.—CARRIAGE POLE.—Christain K. Mellinger, Millersville, Pa.

I claim the plate, A, with its slots, b, and eye, a, forming the adjustable shackle for carriage poles, when arranged, constructed, and applied in the manner and for the purpose specified.

69,357.—VENTILATOR FOR RAILROAD CAR.—Jos. H. Moore, Chicago, Ill.

1st, I claim the shaft, C, when provided with rods or dashers, a a, attached spirally as described, in combination with wind fans, D, located inside of the casing, substantially as and for the purposes described.

2d, The shaft, C, provided with the rods, a a, and fans, D, located and operating as described, in combination with the doors, G, and bath, E, substantially as specified.

3d, The perforated diaphragm or partition, E, in combination with the shaft, C, provided with rods or dashers, a a, and water bath, B, the whole constructed and operating substantially as specified.

69,358.—MACHINE FOR PRESSING HATS.—Monroe and Chas. H. Morse, Franklin, Mass.

We claim a series of dies or molds combined with a movable or revolving steam chest to heat the same, so that by the movement of the steam chest either of said molds may be brought to the proper place to coöperate with the other parts of the machine without disconnecting the molds from the steam chest, substantially as described.

69,359.—CUT-OFF FOR WATER SPOUTS.—Henry W. Mosher (assignor to himself and Edward C. Dudley), Aurora, Ill.

I claim, 1st, The shifting pipe, B, and the flange or collar, c, of the horizontal pivoted plate, C, arranged in relation to the conducting spout, A, in such manner that the lower end of the shifting pipe may be moved horizontally in the arc of a circle, substantially as described.

2d, The combination of the fixed base plate, D, having two openings, with the horizontal pivoted plate, C, which carries the shifting pipe, when constructed and arranged so that the surfaces of these two plates shall remain in contact while changing the pivoted plate from the cistern pipe to the escape opening, and vice versa, substantially as described.

3d, The shifting pipe, B, sustained so that it will maintain its proper connection with the conducting spout, A, and the pivoted flanged plate, C, by means of an annular seat, b, on the lower end thereof, and the fixed ears or projections, a a, on the fixed conducting spout, as herein described.

4th, The pivoted flanged plate, C, provided with an annular groove, s, in the bottom thereof, in such manner as to maintain the relation with the influx opening of the base plate, as herein described and for the purpose set forth.

5th, The filter, G, seated in the influx opening of the base plate, D, the shifting pipe, B, and the pivoted plate, C, all arranged substantially as herein described.

69,360.—WATER WHEEL.—John Mumma, Middletown, Ohio.

Antedated Sept. 23, 1867.

1st, I claim the elongated concave buckets, S, terminating at their upper ends with the cap, V, constructed, arranged, and operating in the manner and for the purpose described.

2d, The floating cylindrical gate, C, in combination with the floats, m, lever, B, and rods, D, arranged and operating substantially as described.

3d, The cylindrical rack or screen, H, in combination with chutes, d, and gate, C, arranged as described for the purpose specified.

4th, The combination of the ball gates, a, with chutes, d, operating substantially as specified for the purpose set forth.

5th, The rings, h h, arms, i, chains, b, guide rods, f, and roller, E, arranged in relation to the ball gates, a, substantially as and for the purpose specified.

6th, The chain disk, I, with its packing ring, r, in combination with chutes, d, and annular diaphragm, K, arranged above the wheel and its curb, J, all constructed and operating substantially as and for the purposes described.

69,361.—VISE.—J. Howard Murray, Trenton, N. J., assignor to himself and T. S. Murray and A. Jameson.

I claim the stationary jaw of the vise with its shoulders, s s', in combination with the screw, D, and nut, E, the whole being constructed as and for the purpose described.

69,362.—AXLE.—Webster Nevins, Falmouth, Me.

1st, I claim the combination of the part, d, ears, e e', joints, f, and metallic rocker plate, b, as and for the purposes hereinbefore described.

2d, The combination of the metallic rocker plate, b, with its bolt, c, worked into and forming a part of said rocker plate, with the forward axle, substantially as and for the purposes described.

69,363.—CHURN DASHER.—Maria A. Ober, Chazy, N. Y.

I claim a churn dasher constructed as shown and described.

69,364.—CARRIAGE STEP.—Charles Parker and Wm. Vogler, Canterbury, N. H.

1st, I claim a vibrating carriage step operated by mechanism connected with the forward axle, substantially as described.

2d, The vibrating step, a, in combination with the fan shaped arm, d, levers, b b', and cross bar, c, substantially as described.

3d, The step a, provided with fan shaped arm, d, substantially as described.

69,365.—LOOSE JOINT BUTT HINGE.—Marshall Perry, New York City, assignor to himself and Geo. W. Gregory, Watertown, N. Y.

I claim a right or left hand hinge composed of two plates, one having a single pintle carrying knuckle, and the other having two socketed pintle receiving knuckles, one projecting from the top and the other from the bottom of said plate, but at opposite edges, substantially as and for the purpose set forth.

69,366.—BED BOTTOM.—Thomas Raser, Geneseo, Ill.

I claim the boxing or castings, C, and polls, B B, in combination with the rubber bands and slats, B and E, as described.

69,367.—DEVICE FOR HEATING TIRES.—Charles H. Reno, Barrington, N. Y.

I claim the chamber, A, pipes, C and D, and branch pipe, E, when made and used as and for the purpose herein specified.

69,368.—MOP HEAD.—Geo. W. Sanders, Springfield, Vt.

I claim the screw cam, e, and slide, d, or its equivalent, in combination with the jaw, c, constructed and operating substantially in the manner described and for the purpose specified.

69,369.—HITCHING DEVICE FOR WHIFFLETREES.—Henry and James M. Saunders, Oxford, Ohio.

We claim the application to the whiffletree, A, of the arms or stops, B, the cases, D, with the spring bolts, C, incased therein with the cords, c, and pulleys, d, when the same are arranged to operate as herein shown and described.

69,370.—MACHINE FOR PREPARING PEAT FOR FUEL.—A. M. Sawyer, Athol, Mass.

1st, I claim the combination of an apparatus for grinding or disintegrating the peat, the endless apron, b, and the squeezing rollers, C and C', arranged substantially as described.

2d, The combination of the endless apron, b, the squeezing rollers, C and C', and the scraper, F, substantially as described.

3d, The scrapers, b h, within the hopper, B, in combination with the series of molds, substantially as described.

4th, Arranging the cams that work the pistons in and out, so as to be adjustable, as described, so that the movement of the pistons in the direction of the diameter of the mold wheel may be varied and thereby the compressing capacity of the mold be increased or diminished, substantially as described.

69,371.—HAT BLOCKING MACHINE.—Julius Sheldon, New York City.

I claim in combination with a hat stretching or blocking machine, the continuous rubber cap, a, applied substantially as and for the purpose set forth.

69,372.—FLASK FOR CASTING.—G. P. Sisson, Florence, Mass.

I claim the bands, G and H, or either of them, in combination with a snap flask, and arranged to operate therewith substantially in the manner and for the purpose herein specified.

69,373.—JOURNAL BOX.—Le Roy M. Taylor and W. D. Fowler, Washington, D. C.

We claim the manner herein described of constructing the box, A B, in two halves, with the hinge, a e, and the turning pin, d, and locking devices, g h, the said construction admitting of a ready removal of the shaft, as well as giving ready access thereto, all as set forth.

69,374.—WIND MILL.—John S. Thornton, Port Gibson, N. Y.

1st, I claim the fan wheels, E E, fans, C C, and arms, D D, constructed and combined substantially as and for the purpose set forth.

2d, The fan, G, in combination with fans, C C, arranged in relation to each other substantially in the manner and for the purpose specified.

3d, The shaft, H, combined and arranged with wheels, F F and E E, substantially as and for the purpose described.

69,375.—HAY DERRICK.—Isaac Van Voorhis, Hillsboro, Pa.

I claim a portable self-balancing derrick consisting of one or more upright posts, with arms hinged on opposite sides, such arms connected with each other in the manner described and the whole operating substantially as and for the purposes above set forth.

69,376.—MATTRESS.—B. F. Walton, Philadelphia, Pa.

I claim a mattress or cushion containing curled hair or other equivalent elastic stuffing material, combined with shavings or chips of cedar, for the purpose specified.

69,377.—CAR BRAKE SHOES.—I. P. Wendell, Philadelphia, Pa.

1st, I claim the combination with a cast iron brake shoe for railroad cars, of pieces of wood, india rubber, or other suitable material, softer than the iron, substantially in the manner hereinbefore described and for the purpose above specified.

2d, The combination of the shoe A, and stock D, by means of the groove, e, tongue, f, and cross key, E, substantially in the manner described and for the purpose set forth.

3d, The combination of the lug, i, and arm, k, with the keys, E and E', substantially as described and for the purpose specified.

69,378.—EXCAVATING MACHINE.—E. H. Williams, Grand Meadow, Iowa, and D. E. W. Williams, Werner, Wis.

We claim the construction and arrangement in an excavator, of the pressure belt, V, when the same is driven by friction caused by the ascending furrow slice, in the manner and for the purpose herein described.

2d, The construction and arrangement of the two shafts, S S, with their pulleys, in combination with the pressure belt, V, as herein described.

3d, The combination of the tightening pulley, L', frame, L, and pressure belt, V, in the manner and for the purpose herein set forth.

69,379.—PILL MACHINE.—A. H. Wirz, Philadelphia, Pa.

I claim so constructing the metallic or inclosing frame of pill machines that the central wooden part thereof shall be attached or fixed to only the end pieces of such frame, so that the sides thereof which form the bearings or ways of the movable part of the machine will be disconnected from such central part and will not be deflected or changed in parallelism by the shrinking of the central wooden part, for the purpose set forth.

69,380.—PICKER FOR LOOMS.—Edward Wright, Worcester, Mass.

I claim the combination of the metal shell, C, filling, D, and spring, E, or its equivalent, with the top of the picker staff, A, substantially as and for the purposes set forth.

69,381.—WATCH REGULATOR.—Henry L. and Edward J. Zahm, Lancaster, Pa.

We claim the regulator, A, having an angular base resting on the operating screw, D, substantially as described.

69,382.—TREADLE FOR PROPELLING MACHINERY.—William C. Abbott, Niles, N. Y.

I claim the combination of the treadles, L M, the straps, O P, the roller, Q, and crank, R, when said parts are constructed and arranged in relation to one another, substantially as set forth.

69,383.—ROTARY ENGINE.—Moses L. Andrew, Cincinnati, O.

1st, I claim the combination and arrangement of the lipped and chambered wings, D D', grooved segmental pistons, E, and springs, F, for the purpose set forth.

2d, The combination of the set screws, H, and springs, I, whereby to hold the follower, G, to the end of the piston, C, with a variable and elastic pressure.

3d, The arrangement of the conical boxes, M, bearings, N, and pinch nuts, O, for the purpose set forth

69,384.—HOISTING APPARATUS.—W. D. Andrews, N. Y. City.

I claim the use of two plain or grooved friction wheels of different diameters upon one shaft when the same are operated and driven by two similar friction wheels of different diameters on one driving shaft placed nearly parallel therewith, and so arranged that the speed and power may be varied by bringing into contact the larger wheel and smaller pinion or the smaller wheel and larger pinion, by means of the eccentric bearing as shown and described, or other equivalent device, for the purpose and object as stated.

69,385.—LETTER FILE.—Frederick Ashley, New York City.

Antedated June 1, 1867.

I claim securing the upper portion, C' of the hook or thumb plate, b, to which it is attached, by a pivot, c, to the frame, A, for operation in combination with a spring, e, so admit of the lateral play of said portion, C, relatively to the lower portion, B, of the hook through a slot or opening, f, in the former, substantially as specified.

69,386.—ELLIPTIC SPRING BRACE.—M. Barker, Humphrey, NY..

I claim the arrangement of the brace rods, C D, their outer ends secured to the center of the lower part of the springs, A B, their inner ends pivoted to the vertical wheel, E, pivoted to the bottom of the wagon box, as herein described for the purpose specified.

69,387.—HAND SPINNING MACHINE.—Turner Barns, Greensburg, Ind.

1st, I claim the arrangement of spindle, J, maintained in a given direction or bearing within the movable arm, H, by means of sliding rod, l, and pitman, 2 3, and stem, I.

2d, In combination with elements of claim 1st, I claim the arm, H, adapted for being advanced and retracted by weight, X, and treadle, Y, and their described or equivalent accessories, substantially as set forth.

69,388.—ERASER AND LETTER OPENER.—G. C. Barney, Philadelphia, Pa.

I claim the blade, B, having convex and concave sharpened or cutting edges intersecting in a sharpened point, substantially as described, forming a combined eraser and letter opener.

69,389.—APPARATUS FOR RECORDING VOTES.—J. E. Beardsley, A. F. Boyle, E. M. Lewis, and M. A. Clancy, Washington, D. C.

1st, We claim the arrangement of the bars, P, with jacket and type, z, bars, O, with indicators, X, connected to bars, P, by the short bar, a3, rods, b', and springs with angular bars, b, when used with the disks, C and D, and lever, N, in the manner and for the purposes herein specified.

2d, The dial plate, A, with its flange, A', and hands, 1 2, when arranged in combination with the drum, E, as constructed in the manner and for the purposes herein set forth.

3d, The metallic disk, C, with its springs, W W, and slots and provided with the radiating flat springs, E, on its back, in the manner and for the purposes specified.

4th, The disk, B, provided with its narrow paired slots, y y, for guiding the U-shaped bars, O, and plate, F, as constructed and arranged as set forth.

5th, The circular disk, G, with points, ', pin, m, and spring, j, on its rear face and with bar, h, spring, h', pin, r2, and pin, g, on the front face in combination with the hollow shaft, f2, and ratchet, k, as and for the purposes herein fully described.

6th, The arrangement of the clutch, K, with cones, q, and pawls, o o, in combination with the ratchets, p p', spring shaft, and spring, H, plates, m m2, and cogs, s s', in the manner substantially as and for the purposes herein specified.

7th, The drum, E, with its rollers, f f, band, g, and double catch, d2, when arranged and used in the manner and for the purposes herein specified.

8th, The disks, A B C D and G, with the drum, E, when constructed as specified with the voting devices and gearing for taking, counting, and printing the voters' names, in the manner and by the operation substantially as herein fully set forth.

69,390.—APPARATUS FOR FILTERING AND PURIFYING SPIRITS.—William F. Bearns, Mount Pleasant, N. Y.

1st, I claim the rectifying vessel, h, provided with the oven flow pipe, p, supply pipe, e', perforated false bottom, m, and perforated head, n, between which the filtering material is retained, as and for the purposes set forth.

2d, I claim the perforated head, n, formed with the movable sections, 1 and 2, held in place by the cross bar, l, acted in the manner and for the purposes set forth.

69,391.—CHURN.—E. O. Bennett, Mt. Pleasant, Iowa.

I claim the combination of the floats, G G, the inclined shaft, F, the perforated diaphragm, H, with the driving machinery of a rotary churn dasher, substantially as described.

69,392.—HEN'S NEST.—C. W. Blackman, Bridgeport, Conn.

I claim a nest for hens composed of a box, A, provided with two doors, B B, hung on pivots, c c, and constructed each of two parts, b b', at right angles with each other and connected by cross rods, C C, all arranged to operate in the manner substantially as shown and described.

69,393.—TOOTH POWDER LOZENGE.—C. E. Blake, San Francisco, Cal.

I claim the making of tooth powder in the form of lozenges.

69,394.—ATTACHING THILLS TO CARRIAGES.—S. S. Bliss, New Bedford, Mass.

I claim, 1st, Securing the side irons, B B, when the same are constructed with solid conical bearings or centers, F F, to the thill, A, by means of clamp bolts, D D, or in any equivalent manner, substantially as described.

2d, The combination of the thill, A, side irons, B B, having solid conical bearings, F F, and clip iron, C, with its conical socket or seats, E E, when the same are constructed, arranged and operated substantially as described and for the purposes set forth.

69,395.—LASTING AWL.—C. K. Bradford, Lynnfield, Mass.

I claim combining with the stock or handle, s, an eye-pointed awl, b, substantially as shown and described.

Also, in combination with such stock and eye-pointed awl, the spool chamber within the handle, substantially as set forth.

69,396.—RESPIRATOR.—Robert Brayton and Samuel Curtis, Fremont, Ohio.

1st, We claim the nostril tubes, b b, chamber, F, and mouth piece, c, in combination with the tubes, a a, and valves, d d', substantially as and for the purpose set forth.

2d, The box, A, and tube, E, in combination with the air chamber, F, substantially as set forth.

3d, We claim a respirator so constructed that it may be connected to either the mouth or nose and so provided with inhaling and exhaling pipes and valves that in breathing the valves will alternately open and close, when used in the manner and for the purposes substantially as set forth.

69,397.—FOLDING SEAT FOR CARRIAGE BODIES.—Richard F. Briggs, Amesbury, Mass.

I claim the combination and arrangement of the support, b, slotted friction plate, d, and slotted upright support, e, substantially as described for the purpose herein set forth.

69,398.—CLOTHES PIN.—R. G. Britton, Springfield, Vt.

I claim a clothes pin formed of the two wooden pieces, A B, united by the pin, b, through the grooved circular projection, a, and the tongue, c, and provided with a spiral spring, h, between the ends, e' e', to close the ends, e e, arranged and operating as described.

69,399.—RATCHET BRACE.—William Brown, Hoboken, N. J.

I claim the spherical ratchet, A, in combination with the socket, c, and pawl, g, substantially as described.

69,400.—LIFTING JACK.—William Green, Holly, Mich.

1st, The combination of the lever, L, upright post, A, grooves, e e, lip, e', and guides, v v, with the dogs, b b', each having the short projecting tooth, i, and arranged and operating substantially as and for the purpose described.

2d, The lifting jack above described consisting of the post, A, having the series of teeth, a a', the grooves, e e, lip, e', and guides, v v, in combination with the lever, L, having the dogs, b b', held in place by the springs, s s', and provided with the teeth, i i, all the parts being constructed, arranged and combined substantially in the manner and for the purpose specified.

69,401.—BELLOWS.—George Bushnell, Schodack, N. Y. Antedated Sept. 26, 1867.

I claim, 1st, The combination of the several smaller bellows with the rod, L, operating substantially in the manner hereinbefore described.

2d, The combination of the bellows, E, with the chamber, F, valve, O, and lever, P, as hereinbefore set forth and described.

69,402.—ATTACHING THILLS TO VEHICLES.—Edward M. Butler, Croton Falls, N. Y.

I claim the rubber cushion, I, or its equivalent, applied to the center pin of shaft couplings, substantially as and for the purpose described.

69,403.—CARRIAGE WHEEL.—J. G. Buzzell, Lynn, Mass.

I claim, 1st, The swivelled spokes, B', when crimped to give them elasticity with the coils, b', substantially as herein shown and described.

2d, The single spokes, B, their outer end swivelled to the rim, C, and their ends screwing into the hub and adapted to be turned to regulate the strain of the wheel, as herein set forth for the purpose specified.

3d, The single spokes, B or B', their inner ends secured to the hub, A, out of the same horizontal lines with the coils, b', as herein set forth for the purpose specified.

4th, The combination and arrangement of the removable ring, D, coiled swivelled spokes, B B', whereby the strain and elasticity of the wheel are adjusted, as herein set forth for the purpose specified.

69,404.—WAGON.—Vasco M. Chafee, Xenia, Ill.

I claim, 1st, Hinging the tongue or shafts of a wagon or other vehicle to the front axle so as to obtain a direct center draft, substantially as set forth.

2d, The combination of the tongue, C, with a center hinge at G, and the side braces, H, attached substantially as and for the purpose set forth.

3d, The plate, F, forming the sand board axle plate and reach receiver combined in one piece, substantially as described.

4th, The combination of the bolster, A, plates, E and F, reach, D, brace, I, and king bolt, K, substantially as set forth.

69,405.—TAG OR LABEL.—Charles H. Chapman, Sherley, Mass.

I claim the spangle, B, in combination with the string, C C', and card, A, made substantially as described and for the purpose set forth.

69,406.—RINGING HOGS.—G. W. Clark, Frankfort, Ohio.

I claim, 1st, The within-described apparatus consisting of the awl or piercing instrument, A B C, and the key or twisting instrument, E F G, constructed and operated substantially as and for the purpose set forth.

2d, The awl, A B C, when provided with a groove, b, and socket, b', substantially as and for the purpose explained.

3d, The key or twisting instrument, E F G g, and hook, H, combined and operating in the manner and for the purpose explained.

69,407.—COAL ELEVATOR AND DISTRIBUTOR.—H. C. Clark and Robert B. Little, Providence, R. I.

I claim, 1st, A coal elevator which is arranged substantially as herein shown and described so that coal or other material can be raised from the hold of a vessel and discharged into any desired one of a number of temporary compartments or pockets and be discharged from the latter into cars or carts, ready for delivery to families all without requiring any manual labor except what is required for raising or lowering the necessary doors or traps, as set forth.

2d, The extension rails, G, when hinged to the ends of the rails, F, so that they can be folded out of the way, substantially as set forth.

3d, The adjustable bolsters, o o, when arranged as set forth for the purpose specified.

4th, The revolving trough, J, when arranged in combination with the rails, F F, of an elevator and with the chambers, B B, substantially as herein shown and described.

5th, The revolving trough, J, when provided with trap doors, p, substantially as and for the purpose herein shown and described.

6th, The device for regulating the discharge of the coal or other material from the pockets or chambers, B, consisting of the screen or board, a, in combination with the hinged plate, d, and with the cord, e, all made and operating substantially as and for the purpose herein shown and described.

7th, The folding extension, G, when made as set forth arranged in relation with the adjustable bolsters, o, stationary track, F, and flexible revolving trough, J, all made and operating substantially as and for the purpose herein shown and described.

69,408.—TERRESTRIAL GLOBE.—G. P. Clarke, N. Y. City.

1st, I claim the division of a sphere or globe into sections or zones, substantially as described and for the purposes set forth.

2d, I claim the construction and application of the spring, I, in combination with the spindle, E E, the trunnions, F F, and the center zone, D, substantially as and for the purposes set forth.

69,409.—HAND REAPER AND MOWER.—J. P. Cook (assignor to himself and John T. Campbell), Rockville, Ind.

I claim a hand reaper or one designed for manual operation composed of a framing, A, having two reciprocating sickles, F F, attached and operated by eccentrics, or their equivalents and suitable gearing simultaneously in opposite directions, substantially as shown and described.

I further claim the adjustable yoke, B, in the framing, A, for the purpose specified.

69,410.—WATER WHEEL.—William Cooper, Hancock, Md.

1st, I claim the gates, G, operated through the medium of the circular plate, I, pivoted arms, H, and springs, J, all arranged substantially as and for the purpose specified.

2d, The combination and the arrangement of the slotted arms, H, springs, J, plate, I, as and for the purpose specified.

69,411.—STEAM SUPERHEATER.—L. R. Cornell, Flatbush, N. Y.

I claim the superheater as described consisting of the parallel cylinders, A, divided into chambers, B2, by heads, B, and supported by means of the uprights, A2, said chambers connected alternately by means of the curved pipes, C, and connecting with the parallel condensing pipes, E, beneath each cylinder by means of the short pipes, D, as herein shown and set forth for the purpose specified.

69,412.—HOLDBACK.—J. C. Covert, Townsendville, N. Y.

I claim the metallic holdback constructed as described consisting of the V-shaped strap, B, attached at its angle by a ring, c, to the neck yoke and at its ends by the snap hooks, b, to the rings, a, of the harness, as herein shown and described.

69,413.—METALLIC HAME TUG.—J. M. Curran and J. C. Baxter, Washington, D C.

We claim a hame tug having its body, A, formed of a single strap of metal with the eye, B, having the hinged or detachable piece, b, and its rear end formed for attaching the buckle, F, substantially as shown and described.

69,414.—AGUE MEDICINE.—F. M. Daniel, Athens, Ga.

I claim a composition or medicine composed of the ingredients in about the proportions herein set forth and for the purpose specified.

69,415.—MUCILAGE POT.—Otis Dean (assignor to Robert W. Young), Richmond, Va.

I claim, 1st, The provision, in combination with the reservoir, A, for mucilage, varnish, or other material of a brush receptacle, D, to contain a suitable material to keep the brush moist, as explained.

2d, In combination with a pot for mucilage or other material I claim the bar, F, for the purpose specified.

3d, The bar, F, applied to the lid, in the manner and for the purpose set forth.

69,416.—DYKES AND LEVEES TO RIVERS.—S. B. Driggs, New York City.

I claim, 1st, The metallic wall or core, when arranged in a curved, corrugated, or zig-zag form, substantially as and for the purpose set forth.

2d, The metallic wall or core constructed with lap joints at the junction of the plates to compensate for expansion and contraction, and arranged at an angle to the horizon in combination with the braces, D, substantially as specified.

69,417.—CAST STEEL.—Francis Ellershausen, Ottawa, Canada.

Patented in Canada, Sept. 14, 1867.

1st, I claim the furnace above described consisting of the retort, B, hearth plate, D, and lower fire chamber, A, when the parts are constructed combined and arranged in the manner above set forth and for the purpose specified.

2d, The hearth plate, D, in a furnace containing the retort, B, and fire chamber, A, substantially as and for the purpose set forth.

3d, The process of obtaining cast steel directly from iron, or from iron ore in connection with wrought iron, substantially as above described.

69,418.—INDEX GAGE AND CALIPER.—D. F. Elmer, Springfield, Mass.

1st, I claim the cylinder, g, slotted and graduated as specified in combination with the jaws, a a', dial plate, B, hand, c, and bolt, H, substantially as described.

2d, The combination of the graduated dial plate, B, with the cylinder, g, in the manner and for the purpose set forth.

3d, The jaws, a a', in combination with the slotted and graduated cylinder g, and bolt, H.

4th, The combination of the bolt, H, with the graduated cylinder, g, as and for the purpose specified.

69,419.—COFFINS.—T. B. Estep, Cincinnati, Ohio.

1st, I claim a coffin, whose joints are hermetically closed by means of cemented rubber strips, D, and sheet metal strips, E, the same being applied and secured substantially as herein described and set forth.

2d, In combination with the rubber strips, D, and metal strips, E, I claim the angle iron, D d d' as and for the purpose explained.

69,420.—COFFINS.—T. B. Estep and W. C. Hofferman, Cincinnati, Ohio. Assignors to Thomas B. Estep.

We claim a coffin whose upper edges of the body, A, are provided with corrugations, a, when used in connection with grooved lid, B b, cleat, C, and india-rubber gasket, E, the whole being arranged and operating substantially as herein described and set forth.

69,421.—MACHINE FOR COILING SPRINGS.—J. W. Evans, N. Y.

1st, I claim the revolving mandrel, I, made capable of a sliding motion in direction of its length in combination with the spirally grooved roll, K, and serving to detach the spring when formed essentially as herein set forth.

2d, In combination with the sliding and revolving mandrel, I, the griping dog, b, and spiral guiding collar, d, for operation on the wire of which the spring is formed substantially as specified.

3d, The sliding and revolving mandrel, I, with its locking dog, b, and band wheel or its equivalent, H, in combination with the spirally grooved rotating roll, K, having formed in it a recess or notch, s, essentially as herein set forth.

69,422.—LOOMS.—Danl. K. Fretz, Cono, Iowa.

I claim the combination and arrangement of the spring, P, and hinge, Z, with the lay and picker staff, substantially as described.

69,423.—AIR PUMP.—Henry Getty, Brooklyn, N. Y.

I claim the gage, K L M, cup, O P, coupling, I, having recess, Q, all arranged to operate in connection with an air pump, as herein shown and described.

69,424.—TELEGRAPH APPARATUS.—Elisha Gray, Oberlin, Ohio

1st, I claim the commutator or pole changer relay, and key arranged to operate conjointly with the main and local circuits so that the operator at any point on the line can reverse the current over the same, from the main battery in the manner substantially as set forth.

2d, The peculiar construction of the commutator when arranged with the line and local circuits for the purpose of obtaining the attraction and repulsion of the direct and reverse currents by means substantially as specified.

3d, The commutator with an electro magnet or vibrating core armature so arranged that its poles are between the poles of the electro-magnets and so connected with the line and local circuits, that when both are closed one magnet is attracting the armature and the other is repelling, in the manner substantially as described.

4th, The arrangement of the magnet, J, electro-magnets, C D, lever, H, and spring, K, combined and operating conjointly in the manner and for the purpose substantially as set forth.

69,425.—WEIGHING ATTACHMENT TO FAUCETS.—L. C. Fisher and A. D. Holliday, El Paso, Ill.

We claim the bar, L, with clutch, D, plate, E, bars, H and F, rods, c c, with springs, G G, and plate, A, the various parts constructed and operating in the manner substantially as and for the purposes set forth.

69,426.—GLASS WARE PRESSES.—Jonathan Haley, Cambridge, Mass.

I claim a press organized substantially as described so that the bed and plunger have simultaneous movements relative to each other in approaching and receeding.

Also the combination as arranged of the cranks, connecting rods, movable bed and plunger-carrying crosshead for the purpose specified.

69,427.—WATCHES.—J. A. Harmann, New York City.

1st, I claim the key, C, constructed as described and adapted to screw into the pendant, E, substantially as described for the purpose specified.

2d, The construction and arrangement of the pendant, B, spindle, F, and hollow screw key, C, as herein set forth for the purpose specified.

69,428.—BEEHIVE.—Edward Harrison, Springfield, Ohio.

1st, I claim the open bottomed cup, A, in combination with a removable strainer, D, substantially as and for the purpose set forth.

2d, In combination with the open bottomed cup, A, the ring, B, for the purpose of readily applying or removing the strainer, D, substantially as and for the purpose set forth and described.

3d, A bee feeding apparatus which can be filled through the top, and from which the feed can only be obtained through the bottom, so that it may be placed to cover an orifice in the top of the hive and the bees enabled to feed while observing their natural inclination to cluster together, and so that it may be replenished with feed without removal or disturbance of the bees as set forth.

69,429.—HORSE COLLAR.—J. G. Haymaker, Salem Cross Roads, Pa.

1st, The catch, B, secured to plate, D, on one end of the collar and spring, b', in the opposite end with or without the pin or entering piece, C, and hole, C', applied to the lower portions of a divided horse collar and locking them together substantially as described.

2d, The pin or entering piece, C, and hole, C', with or without the catch, B, and spring, b', applied in like manner and for like purpose substantially as described.

69,430.—CHAIR SEAT.—Geo. Heesen, Tecumseh, Mich.

I claim as an improved article of manufacture a chair seat formed or constructed of paper twine substantially as set forth.

69,431.—BEEHIVE.—J. H. Hendrick, Clinton, Ill.

1st, I claim the comb-frames, E E', with their cross bars, f f', perforated as and for the purpose described, in combination with the lower division, A, of the hive, and the door, C, and its adjuncts, substantially as set forth.

2d, The surplus honey boxes or drawers, H, constructed substantially as and for the purpose set forth.

3d, The combination of the surplus honey boxes, H, when constructed and arranged substantially as described, with the upper division, F.

69,432.—HAY RAKER AND LOADER.—J. W. Henry, Pecatonica, Ill.

The upper and lower frames, composed of the uprights, E E and D D, with their endless aprons and shafts and drums, arranged with the rake, L, and rods, M M, in such a manner that hay is carried up and emptied forward of the machine as and for the purpose set forth.

69,433.—FILTER.—Foster Henshaw, Washington, D. C.

1st, I claim the alternate sand and cone chambers either with or without the removable coal chambers, g g, when arranged and combined with the head pieces and the perforated plates, e e and f f, one or both substantially as described and for the purposes set forth.

2d, The said filter when provided with the extension pipe, h, as a syphon in connection with the water holder or tank when arranged and combined as set forth.

69,434.—SUSPENSION HOOK FOR HORSE HAY FORKS.—Edward Hicks, North Hempstead, N. Y.

1st, The hook constructed with its prong, e, situated at an angle to its shank, A, substantially as and for the purpose specified.

2d, The eye, A*, of the hook constructed with the angles or corners, a* b* c*, substantially as and for the purpose set forth.

69,435.—CHAIR.—G. H. Hoagland, Port Jervis, N. Y.

I claim the seat frame and back, or either, secured to the side frames of the chair by means of metallic fastenings, c d, forming mortise and tenon locks, substantially as specified.

69,436.—LAMP.—Peter Hoffmann, Constableville, N. Y.

I claim the reservoir, B, provided with the tube, C, adapted to slide in or over the tube, a, for the purpose of pumping the oil from the reservoir, A, as herein set forth for the purpose specified.

2d, The combination of the reservoir, A, sliding reservoir, B, tube, a, sliding tube, C, carrying the tubes, e e, spring, I, and valves, i and k, substantially as and for the purpose specified.

69,437.—STEAM CAR BRAKE.—Thomas and Hatfield Hopper, Newark, N. J.

1st, We claim the combination of the sliding rods, A and D, with the pulleys, C1 and C2, chains, B, and rope, G, when arranged to operate the brake levers, F, in the manner and for the purpose herein described.

2d, The sliding rods, D, and adjustable pulleys, C', when constructed and arranged in the manner and for the purpose herein set forth.

69,438.—CAM FOR LOOMS.—F. E. Howe, and Leonard Washburn, Stafford, Conn.

We claim the combination of the cam wheel, B, having the guide, b, guide, c, guide, c, and guide, f, with the lever, A, having the projections, a d and g, the parts and the whole being arranged and operating substantially as and for the purpose described.

69,439.—LAMP CHIMNEY CLEANER.—J. P. Howell, N. Y. City.

I claim the lamp chimney cleaner with a flexible jointed handle that will yield to the curves of the glass, and covered with cloth or other suitable material in such manner that such cloth may be readily applied or detached substantially as shown and described for the purpose set forth.

69,440.—WASHING MACHINE.—Richard Hubbard, Cadiz, Ind.

1st, I claim in combination with a revolving rubbing cylinder, E, the adjustable washboard, C, and bands of elastic webbing, D, arranged to operate substantially as set forth.

2d, The revolving cylinder, E, when constructed with buckets, E1, and rubbing surfaces, E2, substantially as set forth.

69,441.—BED BOTTOM.—H. L. Ashan, Plattsburg, N. Y.

I claim the combination of the slats, C C, with the narrow slots at each end for securing the bands, a a, that connect the slats to the cross pieces, B, and additionally connecting the slats, one with the other, by the bolts, D D, whereby the slats are prevented from turning as herein specified.

69,442.—CULTIVATOR.—C. M. Jenne, Young America, Ill.

1st, I claim the arrangement with reference to the seat, n, of the beam, l, working upon universal joints and provided with suitable shares and handles, substantially as and for the purpose specified.

2d, The share-stocks, n, pivoted to the beams, l, and furnished with stems, x, extending through the slotted guides, c, substantially as and for the purpose specified.

3d, The wedges, g, in combination with the inclined bars, f, rods, h, and beams, l, whereby the said beams with the shares attached thereto may be raised or lowered substantially as herein set forth.

4th, The wedges, d, in combination with the oblique bars, c, in such manner that the position of the said bars may be changed to adjust the position of the beams, substantially as herein set forth.

69,443.—GATE.—Hans. J. Johnson, St. Peter, Minn.

1st, I claim the combination of the spring, G, toothed plate, F, bent lever, H, plate, E, rod, D, and loops or eyes, B and C, with each other and with the post, A, and rear end of the part, I, of the gate, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the double jointed hinges, K, toothed segments, L, and spring, M, with each other and with the adjacent edges of the parts, I, and J, of the gate, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the adjustable catch, V, with the lower edge of the part, I, of the gate, substantially as herein shown and described, and for the purpose set forth.

4th, The combination of the catch plates, P, lever plates, S, spring, T, and and lever, U, with each other and with the post, B, and plate or bar, O, attached to the forward edge of the part, J, of the gate substantially as herein shown and described and for the purpose set forth.

69,444.—FENCE.—Nelson Johnson, Jasper, N. Y.

1st, I claim the skeleton metallic sockets having either hollow or solid gudgeons and otherwise constructed and operating substantially as described for the purpose set forth.

2d, The boards, C C1 C2, having bevelled upper edges, c', substantially as and for the purpose specified.

3d, The combination of the battens, A2 A3, strips, a3, post or stake, A4, pin a4, and brace, D, substantially as and for the purpose described.

4th, The combination of the socket, B, wedges, c c, and board, C, substantially as and for the purpose specified.

5th, The slots, a a5, gudgeons, b, and pins, a' a6, combined and arranged substantially as described.

69,445.—FENCE.—Nelson Johnson, Jasper, N. Y.

1st, I claim the pins, a, in combination with the fence panels, B, the said pins constituting the supporting pivots of the panels and part or all of them being removable to facilitate the withdrawal of the panels substantially as set forth.

2d, In combination with the parts, A A1 A2 A3, and panels, B, I claim the buttons, C, constructed and applied substantially as and for the purpose specified.

69,446.—KING BOLT.—Enos A. Keasey, Ligonier, Ind.

I claim a king bolt made with a shoulder piece, b, and a projection, d, at the lower end forming a swivel joint with the clip, B, constructed and operating as herein described.

69,447.—STRETCHER FOR PAINTERS' CANVAS.—Miner K. Kellogg, Baltimore, Md.

I claim the application of a knee and screw to stretchers by which canvas can be readily kept tight upon its surface, substantially as herein described and represented.

69,448.—LADDER AND CHAIR.—E. Kohn and J. L. Natcher, Sidney, Ohio

I claim the combined step ladder and chair, consisting of the upright, A, and string or diagonal piece, B, composed of the hinged sections, C D E, together with the brace, F, all combined and arranged as shown and described.

69,449.—CORN PLANTER.—Joseph Krebs and August Johns, Masillon, Ohio,

I claim an improved corn planter formed by the combination of the marking plow, Y, adjustable covering plow, A1, roller, E1, lever, D1, and dropping wheel, T, with each other, said parts being constructed, arranged and operated substantially as herein shown and described and for the purpose set forth.

69,450.—TELESCOPE.—William Kuebler and F. Seelhorst, Philadelphia, Pa.

I claim the adjusting ring, C, when applied to telescopes and to all optical instruments of a similar nature substantially as and for the purposes herein shown and described.

69,451.—PROPELLER.—William Lawton, Green Point, N. Y.

I claim the combination of the arms, F, pivoted gear wheels, C, stationary internally toothed gear wheel, H, and gear wheel, D, with each other and with the driving shaft, E, and working shaft, C, substantially as herein shown and described and for the purpose set forth.

69,452.—DIRT SCRAPER.—Cyrus Little and Joel L. Little, Van Wert County, Ohio, and Reuben M. Dalbey, Springfield, Ohio, assignors to themselves and Doty & Rawlins.

1st, We claim the plates, G G, constructed as described in combination with the springs, e e, on the bar, C, in the manner and for the purposes set forth.

2d, The rod, D, bar, C, and springs, e e, arranged in combination with the scraper, A, as constructed and for the purposes specified.

69,453.—SEWING NEEDLE.—G. A. Lloyd and S. Fetlow, San Francisco, Cal.

We claim making the eye so far from the rear end of the shaft that it will

carry the bight of the thread or twine through the cloth sewed when the needle is pushed through the cloth by the thimble or palm, substantially as described.

2d, We also claim diminishing the shaft of the needle from a little behind the eye gradually to the rear end, both in width and thickness, substantially as described.

69,454.—MACHINE FOR FOLDING LEATHER.—Johnson Lombard, Springfield, Ms.

1st, I claim the table, B, hinged to the horizontal frame, A, as and for the purpose described.

2d, The combination of rollers, c c', hung in the hinged side pieces, D D, the rollers, c2 c3, hung in the double standard, E, the roller, c4, hung in the slide, g, on the table, B, the main shaft, F, hung in the posts, C C1, and the belt, n, passing over all the rollers, the whole being arranged and operating substantially as and for the purpose herein described.

3d, The slide, g, and the brake, m, in combination with the roller, c5, arranged and operating as described.

69,455.—GATE.—Christian Mack, Leipsic, Ohio.

I claim the combination of part, B, latch and lever, H I, gate, a, triangular swinging and supporting frame, E F D, and post, C, constructed, arranged and operating in the manner as shown and described and for the purpose set forth.

69,456.—SASH LOCK AND STOP.—Donald D. Mackay, Whitestone, N. Y.

1st, I claim the spring catch, e, pivoted at its lower end, sliding rod, f, and knob, e*, arranged in relation with the spring rollers, a a', and the sash, A, for operation substantially as set forth, the whole forming a combined sash stop and lock as described.

2d, The sliding bars, b, furnished with rollers, a, and operated by spiral springs, c', as arranged and operating in relation with the sash, A, substantially as and for the purpose specified.

69,457.—FOLDING BEDSTEAD.—S. H. Mapes, Almond, N. Y.

1st, I claim attaching the slats, b, of each section to the rubber or elastic bands, c, which will be more or less stretched when the sections of the slats are to be connected together in the center, that being done by suitable hooks, i, substantially in the manner and for the purposes set forth.

2d, The arrangement of the folding bedstead, with the enclosing case composed of the hinged or swinging sections, e' and D, and the hinged top, E, substantially as described.

69,458.—GOVERNOR.—T. B. McConaughey, Newark, Del.

1st, I claim the combination of notched levers, g g, with spiral spring, h, constructed as and for the purpose set forth.

2d, The looped lever, L, when combined with brake, S, in the manner and for the purpose described.

3d, The governor, B, in combination with arms, e e, notched levers, g g, the spring, h, and lever, L, the whole constructed and operating in the manner and for the purpose substantially as herein set forth.

69,459.—MODE OF VENTILATING MILL STONES.—H. McEldowney, Dixon, Ill.

I claim the spiral flange, C, at the inner side of the curb, B, in combination with the openings, D E, at the upper and lever parts of the curb, all arranged substantially as and for the purpose set forth.

69,460.—WINDOW SCREEN.—James McFeely, North Woburn, Mass.

I claim the perforated or slotted tank, D, reservoir, E, and spout, G, in combination with the frame, A, and screen, B, substantially as described for the purpose specified.

69,461.—TUCKING ATTACHMENT FOR SEWING MACHINES.—John McNeill, New York City.

1st, I claim the combination of the creasing device, I, the pressure plate, E, the folding plate, F, the guide plate, G, and the forming plate, H, constructed as described, that by its mode of operation the plaits or tucks of shirt bosoms or other garments shall be creased, folded and finished by sewing when attached to a sewing machine.

2d, In combination with the above the following plate, K, having the end, m, doubled and turned in upon itself for forming the first or outside one of a set of plaits or tucks constructed and operating substantially as described.

69,462.—FENCE.—M. D. Messler, New Lebanon, Ohio.

1st, I claim the rods, E, having spirally shaped lower ends, their upper ends bent and secured to the upright of a fence, substantially as described.

2d, The wires, d, forming the connection between the panels of a fence, constructed and arranged substantially as described.

3d, In combination with the above the pivoted cleats, a a', secured and arranged substantially as described.

69,463.—NEEDLE SETTER FOR SEWING MACHINES.—Thomas C. Michener, St. Louis, Mo.

I claim the combination of the spring arms, B B', with the adjustable arm, A A', and the pointed needle guide, c, all arranged in the manner and for the purpose described.

69,464.—CAR COUPLING.—Daniel W. Miller and Michael Brestle, Jr., Middletown, Pa.

1st, We claim the sliding block, C, provided with pin or bolt, e, and constructed with recesses, o, (one or more) when said recesses are arranged at an angle to the horizontal plane, substantially as and for the purposes set forth.

2d, The sliding block C and its pin, d, combined with the link, G, and sheath, A, all constructed arranged and operating substantially as herein set forth.

69,465.—SHIFTING STEP FOR VEHICLES.—Edward Miller, Milwaukee, Wis.

1st, I claim an improved shifting step, A, formed with a hook or flange, a', upon its upper end, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the hinged handle or top piece, B, with the step, A, substantially as herein shown and described, and for the purpose set forth.

69,466.—MACHINE FOR MILLING TWIST DRILLS.—L. B. Miller, Jersey City, N. J.

1st, I claim the spindles, D and E, one within the other revolving in a common head and locked together by the spring bolt, b, in combination with a longitudinal feeding device having a diagonal adjustment, to a rotary milling tool or cutter substantially as specified.

2d, The arrangement and combination of the vertical slide, I, adjustable slide, T, intermediate sliding bar, V, and slotted eccentric, R, for regulating the depth of cut, substantially as set forth.

3d, In combination with said vertically adjustable sliding carriage the adjustable cam or eccentric, V, elbow lever, W, and clutch, A', operated by the screw, b', for giving an irregular depth of cut throughout the line or length thereof, substantially as specified.

4th, The reversing carrier or spring borne clutch, D', in combination with the clutches, g' A', nuts, e' c' and screws, d' b', for operation together as herein set forth.

5th, The arrangement of the driving shaft, J, the work holding carriage having a longitudinal and swiveling motion as described and the burr or milling tool, A, substantially as specified.

69,467.—DOUGH KNEADER.—W. B. Morrison, Muskegon, Mich.

I claim the box, A, provided with a concave surface, B, in its bottom, in combination with the arms or rods, E, having shoes, G, attached and operated from a crank shaft, D, substantially as and for the purpose specified.

69,468.—CULTIVATOR.—J. Madison Morse, Sandwich, Ill.

I claim the combination of the cart and frame, B C D E F G H, constructed and arranged substantially as described, with an ordinary corn cultivator, as and for the purpose herein set forth.

69,469.—THILL COUPLING.—E. M. Naramore (assignor to himself and W. M. Naramore), North Underhill, Vt.

1st, I claim the bed piece, A, constructed substantially as described, for the purposes set forth.

2d, The knuckle, B, formed of the parts, a b c, in combination with the bed piece, substantially as described.

3d, In combination with the bed, A, and knuckle, B, I claim the spring catch, C, with its link, f, and spring, J, substantially as and for the purposes herein set forth.

69,470.—COMPOSITION FOR IMITATION RUBBER.—J. B. Newbrough and E. Fagan, New York City.

We claim as a new composition stearine or margarine, and sulphur, gum copal, or other suitable material, so combined and in such proportions as to form a compound of the nature herein described.

69,471.—WARPER AND DRESSER PLATE.—Ambrose J. Nichols, North Providence, R I.

I claim the eyelets, B, when placed in the holes in the copper, A, in such a manner as to turn loosely therein and allow the thread to wear equally upon all sides and prevent the formation of channels, as herein shown and described.

69,472.—PICKER FOR LOOMS.—Bradford W. Nichols, Phœnix Village, R. I.

I claim the combination of the picker of the picker staff and binder, b, with a raw hide case, a, the case having laps, b, projecting over the sides of the staff, and a shoulder, i, in the hide, to hold the filling, g, in place, substantially as described.

69,473.—PIPE AND BOLT CUTTER.—C. C. Parsons, Boston, Mass. Antedated Sept. 18, 1867.

I claim a pipe or bolt cutter having two rotary disk cutters arranged to operate substantially as set forth.

69,474.—REIN HOLDER.—Buel D. Pease, Madison, Pa.

I claim an improved rein holder formed by the combination of the frame, A, cam, B, and spring, D, with each other, substantially as herein shown and described and for the purpose set forth.

69,475.—CHURN.—W. C. Peck, Wheeling, West Va.

I claim the detachable cream box, D, dashers, G, bar, B, cross bar, I, and uprights, H, all constructed and arranged as herein shown and described.

69,476.—HARVESTER RAKE.—G. M. Peters, Granville, Ohio.

1st, I claim the reciprocating rake carriage, I I', in combination with the reciprocating slide, K, and chain, M, substantially as described.

2d, The rake head, J, pivoted to the reciprocating carriage, I I', in combination with the reciprocating slide, K, operating as described.

3d, The arrangement of the ways or guides, H L, in relation to the platform and in combination with the rake carriage and lifting slide, substantially as described.

4th, The combination of the reciprocating and lifting rake, J, and carriage I, ways or guides, H L, and endless chain, M, with the platform, G, substantially as described.

69,477.—APPARATUS FOR HEATING WATER AND CONDENSING STEAM.—Henry J. Phalen, Plantersville, Texas.

I claim the arrangement of the pipes, D G, for the passage of the steam and of the water or other liquor, whereby the water or liquor is forced in the same direction as the current of steam, by which it is overtaken and with which it mingles in a spray-like or other divided condition, substantially as and for the purpose herein specified.

69,478.—PLOW.—Mason Prentiss, Cambridge, N. Y.

I claim the adjustable shoe, D, applied to the curved rear part of the plow beam, A, substantially in the manner as and for the purpose set forth.

69,479.—MODE OF OPERATING HORSE HAY FORKS.—A. J. Purviance, Keosauqua, Iowa.

1st, I claim the conveyor, D, provided with the horizontal ribs, C C, having circular holes, d, roller, a g, cam, F, and crank, G, constructed as described, for the purpose specified.

2d, The projection, J, in combination with the crank, G, and cam, F, substantially as described for the purpose specified.

3d, The fork head, E, provided with the shoulders, e, whereby it is held in position by means of the cam, F, as it enters the conveyor, D, substantially as described for the purpose specified.

4th, The combination of the fork head, E, conveyor, D, cam, F, crank, G, and projection, J, substantially as described.

69,480.—POTATO BAKER.—Adam Reid, Buffalo, N. Y.

I claim a potato baker made to sit upon or in the pothole of a cooking stove, having an inner shell, D, for the support of the articles to be baked, and a double wall, forming an annular hot air chamber, A, with apertures, C, made through the inner wall, substantially as described.

69,481.—BULLET MACHINE.—C. H. Remington, Dubuque, Iowa.

1st, I claim the combination of the slides, b b', actuated by the cams, a a', the moving die, c, and the stationary die c', the punch, d, and the feeding slide, g, arranged and operating substantially as and for the purposes herein described.

2d, The head block, k, the clamping jaw, k1, the sliding arm, k2, and slide piece, k3, actuated by the side cam, m, combined and operating substantially as and for the purpose herein described.

69,482.—LOGOTROPE.—Charles Richardson and J. Graeme, Jr., New York City.

I claim the supporting rods, b, sleeve, c, and nut b*, arranged in relation with each other and with the disks, furnished with suitable words at their peripheries, substantially as and for the purpose specified.

69,483.—GENERATING GAS FROM HYDROCARBON LIQUIDS.—M. S. Richardson and E. A. Pond, Rutland, Vt,

1st, We claim in the manufacture of gas from hydrocarbon fluids, the method herein indicated of discharging air in a divided state into the body of the carbureting fluid, in such manner that the discharge of the said air may at all times take place at the same depth below the surface of the fluid, for the purposes set forth.

2d, The combination with the carbureter or tank for containing the hydrocarbon, of a float provided with concentric compartments under the arrangement described, so that the air in passing from one compartment to another, shall be forced in a divided state into and through the body of the carbureting fluid, as set forth.

3d, The float herein described, the same consisting of a series of open bottomed concentric chambers, communicating one with the other by means of tubes or pipes, and connected with the air supplying apparatus, substantially as set forth.

69,484.—SEEDING MACHINE.—Edwin Ritson (assignor to W. H. Burtis), Maltaville, N. Y.

1st, I claim the combination of the rotary furrow openers, E, and coverers, L, attached respectively to the frames, C D, the former being connected by hinges or joints, a, to the front end of the frame, A, and the latter connected by hinges or joints, b, to the rear of the frames, C, substantially as and for the purpose set forth.

2d, The vibrating shoes, L, arranged and operated as shown, in connection with the seed box, K, provided with one or more compartments, and all arranged substantially as and for the purpose specified.

3d, The attachment of the coverers, L, to the rear bars, d, of the supplemental frames, D, to admit of the adjustment of the coverers, substantially in the manner as and for the purpose set forth.

4th, The combination of the furrow openers, E, coverers, L, and the seed-distributing device composed of the vibrating shoes, L, and perforated bottom of the seed box, provided with slides, o, all arranged substantially as and for the purpose specified.

69,485.—OIL CAN.—Martin Robbins, Cincinnati, Ohio.

1st, I claim a can or vessel for containing oil sirups or other liquid, provided with a vacuum handle, and an adjustable nozzle, substantially as herein shown and described.

2d, The nozzle, E, adjustably attached to the stopper, D, the latter being continued into the can to form the conducting tube as herein set forth, for the purpose specified.

3d, I also claim the combination of an adjustable nozzle, with the can or vessel substantially as herein shown and described.

69,486.—COMBINED CORN PLANTER AND PLASTER DROPPER.—Henry Rodes, Clarence Center, N. Y.

1st, I claim the combination with a planter, C, and plaster dropper, D, of a dropping arrangement that by a single movement shall open the one and close the other, substantially, and *vice versa*, as herein set forth.

2d, The special combination and arrangement of the dropping apparatus, consisting of slides, E G, connected with the single arm, J, and operating in the manner and for the purpose herein specified.

3d, The combination of the sliding gage plug, n, with the slide plates, 11', arranged as described, and operating in the manner and for the purpose specified.

4th, The construction, combination, and arrangement of the draw bars, 1 f', stirrup, r, and connection, w, with the drill tooth, t, and coverer, v, as herein set forth.

5th, The combination and arrangement of the elastic connection, a1, and the adjusting gage, b1, with the pivoted plaster tube, m, operating in the manner and for the purpose set forth.

6th, The arrangement of hoppers, C D, with dropping slides, E G, the rock shafts, E H, with connection, G, the cam and roller, c a1, and the draw bolts, I 11, with stirrup, r, and connection, w, the whole operating in the manner herein set forth.

69,487.—COMBINED HORSE RAKE AND HAY SPREADER.—Charles Rogers, Barker, N. Y.

I claim the frame, C, arranged in rear of the axle, A, and supported by the castor wheel, c, in combination with the bearings, g h, and the head of a rake or tedder, substantially as and for the purpose specified.

69,488.—TRUNK.—Alfred V. Ryder, New York city.

1st, I claim in a trunk, the body of which is composed of three main portions or compartments, A B C, the front upper, or upper front end, A, of which is hinged as at a, and made to open and close as described, constructing the front of the rear portion, B, of a shelving or receding character relatively, to the dividing cut or cuts, b, substantially as and for the purpose or purposes herein set forth.

2d Hinging the front upper, or upper front portion, when the same is arranged to open as described, relatively to the remaining portion or portions of the trunk, at a point or in a line which is in advance of a vertical center, through the width of the trunk, essentially as specified.

69,489.—GRAIN AND SEED CLEANER.—Jacob Battison (assignor to himself and Ambrose Frayer), Ripley, Ohio.

I claim the bolt, B, in combination with the shake sieves, M, conductors, N and O, when arranged and operated conjointly with a fan or blower, in the manner and for the purpose substantially as set forth.

69,490.—SHOE KNIFE.—Henry Sauerbier, Newark, N. J.

I claim the sliding or adjustable guard or gage, C, provided with a lip, b, and turned up edge, in combination with the blade of the knife, substantially as and for the purpose herein set forth.

69,491.—SHOE KNIFE.—Henry Sauerbier, Newark, N. J.

I claim the guard, C, having the lip, b, at its outer end, when provided with the beveled recess, c, resting against the blade, A, as and for the purpose set forth.

69,492.—CENTER BOARD.—John G. Saunders, Narragansett, R. I.

1st, I claim the raising and lowering of the center board, in an oblique direction, by means of an oblique slot or groove, and a fixed bolt, or their equivalents, arranged substantially as and for the purpose set forth.

2d, The rack bars, C, in combination with the pawls, c, and the center board, B, all arranged substantially as and for the purpose specified.

69,493.—WASHING MACHINE.—John Schermerhorn, Spring Creek, Pa.

1st, I claim the construction of the boxes, D, of the square part, g, and the arm, d, with hooked end, e, for receiving the spring, f, in combination therewith, and with the rubber, B C, substantially as and for the purpose described.

2d, The combination of the spring, f, adjustable boxes, D g d e, and corrugated rollers, C, meshing with the corrugation of the rounded bottom of case, A, substantially as described, for the purpose specified.

69,494.—GATE.—William Serviss, Sidney, Ohio.

I claim the arrangement of the post, C, of the partial inclosure, relatively to the posts, a b, when provided with a hinged stop, F, whereby the gate is retained between the points C a, of the inclosure, or may be opened at pleasure, substantially as set forth.

69,495.—WATER WHEEL.—Samuel Shive, Forks, Pa.

1st, I claim the wheel, A, mounted on the sliding frame, B, secured to the hinged pulley frame, D, and operating substantially as described, for the purpose specified.

2d, The bisged pulley frame, D, in combination with the wheel, A, constructed and operating substantially as described.

69,496.—RAILWAY SWITCH.—Daniel Simmons, N. Y. city.

1st, I claim the horizontal operating bars, G, upright bars, I, steams, h, and springs, i, arranged to operate in relation with each other, and with the platform, fulcrum, r, and the laterally projecting pins or studs, b*, of the lever heads, A*, substantially as and for the purpose herein set forth.

2d, The combination of the locking pawls, d, and rods, d', with the switch rails, C, and levers, D, substantially as and for the purpose herein set forth.

69,497.—BOB SLEIGH.—L. F. Skinner, Springvale, Wis.

I claim the hubs, a a a a, spokes, d d d d, forming the segment of a wheel when attached to runners, A A A A, in combination with axles, B B, constructed as described, and operating as set forth.

69,498.—BUTTER TRYER.—Wm. H. Sloan, St. Louis, Mo.

I claim the scraper, B, when provided with a handle, b, and a convex scraper piece, b3, as described and set forth.

69,499.—STEAM GOVERNOR.—H. D. Snow, Bennington, Vt.

I claim the arrangement of the revolving head, n, segment arms, p, and governor balls, in combination with the valve rod and adjustments, u v, as and for the purposes set forth.

69,500.—TOY PISTOL.—Fisher A. Spofford, and Matthew G. Baffington, Columbus, Ohio.

We claim the toy pistol, consisting of a barrel open at both ends, with the aperture, E, opening directly into the barrel, near the breech, and having the spring, h, located therein, as shown, with the piston, B, operated by the spring, C, and the trigger, D, arranged to release the piston by elevating its front end, all as herein shown and described.

69,501.—ATTACHMENT FOR SCHOOL DESKS.—David J. Stagg, New York city.

I claim the sliding frame, B, constructed as described, having the extended top-supporting rail, c, and attached to the desk by means of the spring catch, C, said frame adapted to fit in the slot, a, of the desk, substantially as described for the purpose specified.

69,502.—COMBINED CORN PLANTER AND CULTIVATOR.—J. F. Sterett and C. M. J. Reynolds, Ottumwa, Iowa.

I claim the arrangement of the hopper, D, upon the beam, with the pipe, J, slides, H and a, bar, F, and the round of the handles, with its lever, G, and arm, E, the several parts being used and operating as and for the purposes set forth.

69,503.—FIRE-ALARM TELEGRAPH.—J. H. Stevens, Boston, Mass.

1st, I claim the rheotrope, D, and reversing magnets, I, in combination with each other, when connected with and operated by signal box, K, substantially as described.

2d, The arrangement and combination of the wires, M M, switches, S, and knobs, C, so as to include in or exclude from the circuit the rheotrope, D, substantially as and for the purpose described.

3d, The described construction and arrangement of signal box, K, start magnet, E, rheotrope, D, with its springs, L, and wires, M, with switches, B, and reversing magnet, J, substantially as and for the purposes described.

69,504.—ODOMETER.—M. W. Stevens and E. H. Drake, Stoughton, Mass.

We claim the application of the odometer with the hub, B, and its journal, D, in manner as specified, in connection with the formation of such journal with a notch, x, and the application thereto, and to the odometer train, of a pitman, y, and a spring, z, to operate the said train, substantially in manner and by the revolution of the wheel hub on the axle journal, as specified.

We also claim the combination and arrangement of the cap or guard, v, with the train, the dial plate, and the case, B, and its hollow shank, C.

We also claim the arrangement and combination of the spring, z, and the cranked shaft, t, and its pawl, r, with the train of gears and screws for operating the index arbor, g, as specified.

69,505.—FURNACE.—Wm. Stevens, Bloomington, Ill.

1st, I claim the tube, E, and pipes, 11 l, arranged in the manner as specified, and used for the purpose set forth.

2d, The arrangement of the chamber, D, perforated plate, G, in combination with the tube, E, and pipes, 11 l, in the manner and for the purposes specified.

69,506.—STOVEPIPE JOINT.—Wm. Stine, Elmore, Ohio.

I claim the perforated metallic ring for securing the joints of stovepipes and smoke stacks, provided with the central flange, a, around its periphery, when constructed as described, with the ends upon both sides of the flange, a, of equal or of unequal diameters, substantially as herein shown and described.

69,507.—WASHING MACHINE.—T. B. Stout, Keyport, N. J.

I claim the rubber, B, having a vibrating or self-rocking movement, and arranged and operating substantially as and for the purpose herein specified.

I also claim the wash-board, C, rocking, or self-adjusting sidewise, in combination with the rocking movement of the rubber, B, at right angles thereto, substantially as and for the purpose herein set forth.

I also claim the adjustment of the washboard so as to bring its flutings or corrugations either parallel with or oblique to those of the rubber, substantially as and for the purpose herein specified.

69,508.—SLEIGH RUNNER.—W. H. Stroup, Philadelphia, Pa.

I claim the runners, A A1, hings, C, and keeper, B, arranged in the manner and for the purposes specified.

69,509.—GATE.—A. Tandy, Columbia, Mo.

I claim forming the upper hinge of a slot in the upper end of of the bar, C, and guide, E, substantially in the manner herein shown and described and for the purpose set forth.

69,510.—WOOD MITERING MACHINE.—Robert F. Tomkins, New York city.

I claim the adjustable sector-shaped rest blocks, B, having guide pieces, U, in combination with the guide wing, M, adjusted by means of the set screws, P, in the slotted plate, K, and bearing the inclined cutter blades, N, and with the adjustable guide strips, R, substantially as described for the purpose specified.

2d, The adjustable grooved post, V, in combination with the cutter blades, N, and rest blocks, B, as and for the purpose specified.

69,511.—CAR COUPLING.—Joseph Trent, Millerton, N. Y.

I claim the combination and arrangement of the revolving buffers, B B1, buffer bars, D D1, blocks, G G1, springs, K K1, and rods, H H1, substantially as described for the purpose specified.

69,512.—MOP HEAD.—John Troxel, Reedsburg, Ohio.

I claim the arrangement of the heads, A A, arms, B B, levers, C and D, and link, E, the several parts being constructed and operating in the manner and for the purpose set forth.

69,513.—SHEEP SHEARS.—Francis Van Doren, Adrian, Mich.

1st, I claim having two or more stationary guards or cutters, E E, and one movable cutter, A, on sheep shears, substantially as and for the purpose herein shown and described.

2d, The movable cutter, A, in combination with two or more stationary guards or cutters, E E, and gages, a b, all made and operating substantially as herein shown and described.

69,514.—SPRING BED.—Charles Van Dyeck, Nashville, Tenn.

I claim the combination of the three frames, C a b, mattresses, A B, diaphragm, H1, springs, D D1 and H, arranged substantially as described.

69,515.—LOOM.—A. O. Very, Andover, N. Y.

1st, I claim operating the treadle shaft of looms by means of a direct action of the lay on a cam formed on a loose jacket on the treadle shaft, substantially as described.

2d, The spiral cam, G, on the loose jacket, F, on the treadle shaft, C, substantially as and for the purpose set forth.

3d, The roller pins, g g, on the under side of the shuttle race, H, operating the cam, G, on the loose jacket, F, substantially as and for the purposes set forth.

4th, Making the straps operating the picker staffs adjustable, substantially as described.

5th, The tripper arms, c d, on the treadle shaft, C, substantially as and for the purpose described.

69,516.—LOOM.—W. B. Walker, Salem, Iowa.

1st, I claim the construction and arrangement of the downward projecting arms, b b, slotted longitudinally in which the pickers, f f, are pivoted and supporting the picker blocks, g g, which are mortised to receive and inclose the upper ends of said pickers, as herein shown and described for the purpose specified.

2d, I claim the pickers, f f, one in the end of each arm or exterior of the lay with the projections or arms, d d, having a convex point and being concave from that to the main body of the picker, substantially as described and for the purposes set forth.

3d, The main springs, c c, with the outer end convex or bent up to work on the convex point of the projection, d d, of the arms of the pickers, substantially as described and for the purpose set forth.

4th, The arrangement and combination of the platforms, l l, fastened on the top of the sides of the loom with and for the purpose of holding the guide springs, i i j j and k k, also the set springs or catches, r r, and elbows, s s, to which the set springs are attached, substantially as described and for the purpose set forth.

5th, The cloth beam, 7, with the ratchets, 2 and 3, attached and the surface covered by cards or filled with pins, the spring, a'', and pawls, 4 and 6, substantially as described and for the purpose set forth.

6th, The extra cloth beam or receiving beam on which the web will be received by the action of the take-up beam in the combination with the take-up beams, constructed and operated as described.

69,517.—WOODEN PAVEMENT.—C. G. Waterbury, N. Y. City.

1st, I claim the blocks, A, with their projections, B and E, constructed and arranged substantially as and for the purpose set forth.

2d, In combination with the blocks, A, having projections, B and E, I claim the movable strips, C, and bolts, D, substantially as and for the purpose set forth.

3d, In combination with the blocks, A, having projections, B and E, I claim the bolts, D, with or without the strips, C, substantially as and for the purpose described.

69,518.—DROP HAMMER.—W. H. Waters, Springfield, Mass

1st, I claim a pair of rollers, F F, each of which is separately rotated by power applied to the pulleys, H H, in combination with the board or strap and drop substantially as set forth so that lifting power is applied to each surface of the strap or belt in the manner and for the purposes set forth.

2d, In combination with the rod, 5, and drop I claim the mechanism substantially as set forth, for sustaining the rod at any point to which it may be raised as specified.

69,519.—BREECH LOADING ORDNANCE.—Asa Weeks, Minneapolis, Minn.

1st, I claim the arrangement of the pins, w v, with coil springs, when used in combination with breech blocks, C, as constructed in the manner set forth.

2d, The combination of the sliding bar, K, and hammer, E, with the block, c, and cannon, A, for the purposes herein specified.

69,520.—HORSE COLLAR FASTENING.—D. C. Westfall, Mifflin, Pa.

I claim the horse collar fastening consisting of grooved hollow caps for receiving and concealing the ends of the collar, forming a bearing for the hames, and concealing in one part the spring sliding bar, f, which catches over the bevel hooked projections of the other part when constructed and operating as herein represented and described.

69,521.—SPIKE.—James A. Whitney, Jersey City, N. J. Antedated, Sept. 26, 1867.

I claim a notched, toothed, or serrated spike constructed with a spiral or twisted portion, substantially as herein set forth.

69,522.—SKATE.—Fridrek Wichehaus and Charles Rothe, Newark, N. J.

We claim the elliptic heel button, f, firmly secured to the spring lever, E, which plays in the recess, d, between the rear standard, D, and the sole plate B, and whose forward end drops into the rear end of the foot plate, A, in the manner and for the purpose herein described.

69,523.—SCHOOL DESK AND SEAT.—D. C. Wilson, Beaufort, S. C.

I claim the school desk and seat constructed as described consisting of the end frame, A B, framed into each other and held in position by means of the top board and shelf, the seat being formed upon the timbers, B, secured to the front part of the frame, A, as herein shown and described.

69,524.—WATCHMAN'S REGISTER.—Adolph Witt, Cincinnati, Ohio.

1st, I claim in combination of the tubular center shaft, C c c', minute hand and stem, D D' d d', axial rod, E e, spring hour hand, K k, perforated dial plate, N n, shutters, O, and closing follower, R, the whole being arranged and operating substantially as herein described and for the purpose specified.

2d, I also claim the combination of the hour wheel, F f, intermittent wheel, H h, and spring, J, as and for the purpose set forth.

3d, In combination with the seven described elements of the first clause, I further claim the spring belt crank, T t t', and rod, U u, for the objects explained.

4th, I claim the combination of lever, W, cam, X, shaft, Y, spring, Z, and operating knob or handle, Y', or their equivalents for the purpose described and set forth.

69,525.—SAW SET.—James C. Woodward, Franklin, Conn.

I claim the hammer-head, C, constructed as described provided with the stem, K, fitting longitudinally into the outer or swinging end of the shank, B, and adjusted by means of the thumb screw, M, as herein set forth for the purpose specified.

2d, I also claim the set screw, Z, substantially as and for the purpose described.

69,526.—CUT OFF VALVE GEAR.—J. N. Wrigley and George Smith, (assignors to John N. Wrigley,) Newark, N. J.

We claim the cams, d d, on the wheel, H, the adjustable bar, K, the bell crank, J, and the rod, m, arranged and operating substantially as described for the purpose set forth.

69,527.—Steam Safety Valve.—J. N. Wrigley and George Smith (assignors to John N. Wrigley), Newark, N. J.

1st, I claim the construction and arrangement in the shell, A, of the stationary valve, B, movable valve seat, C, substantially as herein set forth for the purpose specified.

2d, The construction and arrangement of the shell, A, stationary valve, B, movable valve seat, C, stem, E, and lever, F, substantially as described for the purpose specified.

69,528.—Boots and Shoes.—B. C. Young, Boston, Mass.

I claim a boot having buttons or knobs securely fastened to and projecting from the opposite outer surfaces of the leg near the top thereof, or in such position that by applying a fore finger under each button or knob, and a thumb to the inner surface opposite said button or knob, the boot may be securely grasped to pull it on the foot, substantially as set forth.

69,529.—Harvester.—Elijah Young, Fayetteville, Mo.

I claim the adjustable disk, c4, in combination with the spring pawl and the ratchet, substantially as described and set forth.

REISSUES.

2,767.—Railroad Chair.—John McMurtry, Lexington, Ky., assignee of J. A. Roebling and J. McMurtry. Patented Oct. 31, 1865.

1st, I claim a solid block of cast iron or steel of sufficient length to rest on two or more sleepers and constructed as described, in combination with a plate of iron or steel of like length, fitted on the opposite side of the rails and secured to said block and rails in the manner and for the purpose specified.

2d, I claim further a plate of iron or steel of such length that it will rest on two or more sleepers, in combination with a like plate fitted on the opposite side of the rails, both being constructed and connected as and for the purpose set forth.

3d, I also claim the vertical flanges pendant from the inner edge of the bases of the two plates, in combination with said plates, substantially as and for the purpose described.

2,768.—Breech-loading Fire-arm.—Wm. H. Miller and Geo. W. Miller, West Meriden, Conn. Patented Dec. 26, 1865.

We claim, 1st, The latch, E, arranged and operating in combination with the face plate, b, oscillating breech piece, B, and catch, i, substantially as described.

2d, We also claim the combination of the swinging breech piece, striker, and detent, operating together as and for the purpose described.

3d, We also claim the plate ejector, F, with its shoulders, stop, and finger, when hung loosely upon and constructed in its movements solely by the pivot pin of the swinging breech and moving around the same center with it and operated by the inserting of the cartridge and the swinging of the breech, in the manner substantially as described.

2,769.—Putting up Powders, etc.—Henry Sawyer, Roxbury, Mass. Patented Jan. 5, 1864.

I claim a package or case which when made with distributing holes and filled, is cemented by the wax or wafer, e, as set forth.

DESIGNS.

2,792.—Trade Mark.—Thomes Bakewell, Pittsburgh, Pa.
2,793.—Statuette.—Hammatt Billings, Boston, Mass.
2,794.—Spoon Handle.—Luther Boardman and Norman S. Boardman, East Haddam, Conn.
2,795.—Watch Plate.—Alfred Gerard, Somerset county, N. Y.
2,796.—Range.—S. W. Gibbs, Albany, N. Y.
2,797.—Trade Mark.—Stuart Guywn, New York City.
2,798.—Sewing Machine.—T. C. Page, Chicopee, Mass.
2,799.—Woven Fabrics.—William B. Weeden, Providence, R. I.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address Munn & Co., *37 Park Row, N. Y.*

54,432.—Head Block for Saw Mills.—Simon F. Stanton (assignee of J. M. and S. F. Stanton), Manchester, N. H. Dated May 1, 1866. Application for reissue received and filed Sept. 19, 1867.

I claim the combination of the graduated notched guide, R, and vibratory lever, Q, with its pawl and ratchet wheel, P and O, or the equivalent thereof, for moving the uprights different and determinate distances by the simple movement of the lever, substantially as and for the purpose herein specified.

I also claim the combination and arrangement of the pinions, D D D, and double setts of racks, b b b and c c c, for moving the uprights by the turning of the shaft, E, substantially as herein set forth.

I also claim the construction and arrangement of the shaft, E, sections, coupled by clutches, F F, which may be connected or disconnected at pleasure, substantially as and for the purpose herein specified.

I also claim the screws, J J J, arranged upon the upright and operating substantially as and for the purpose herein set forth.

I also claim the dog apertures in the uprights for the reception of horizontal dogs, substantially as described.

I also claim the clamp hooks or dogs, M M M, arranged and operated substantially as and for the purpose herein set forth.

60,342.—Tap Borer.—W. A. Ives & Co., New Haven, Conn., assignees by mesne assignments of Silas S. Crocker, Maquokota, Iowa. Dated Dec. 11, 1866. Application for reissue received and filed Sept. 25, 1867.

I claim, 1st, A borer constructed from a plate carved so as to form a conical shaped instrument, one edge projecting slightly above the other, the salient edge sharpened while the other forms a guide and the space between the two edges of the throat of the instrument combined with a gimlet point, whether the edge be spiral or straight.

2d, The volute-shaped tool with a sharpened salient spiral edge with or without the gimlet point, substantially as described.

☞ Note.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of 30 days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application to* Munn & Co., *Solicitors of Patents, 37 Park Row, N. Y.*

Advertisements.

The value of the Scientific American *as an advertising medium cannot be over-estimated. Its circulation is ten times greater than that of any similar journal now published. It goes into all the States and Territories, and is read in all the principal libraries and reading rooms of the world. We invite the attention of those who wish to make their business known to the annexed rates. A business man wants something more than to see his advertisement in a printed newspaper. He wants circulation. If it is worth 25 cents per line to advertise in a paper of three thousand circulation, it is worth $2.50 per line to advertise in one of thirty thousand.*

RATES OF ADVERTISING.

Back Page.....75 *cents a line.*
Back Page, for engravings.....$1.00 *a line.*
Inside Page.....40 *cents a line.*
Inside Page, for engravings.....60 *cents a line.*

TINNER'S TOOLS—Good Second-hand set for sale. GEO. G. ATWOOD, Geneva, N. Y.

THE MAGIC SCALE—A New Thing.—Send for Circular. H. MARANVILLE, Akron, O.

D. BALLAUF, MODEL MAKER, No. 414 Seventh street, Washington, D. C. Orders for Certified Duplicates of Patent Office Models and Original Models for Inventors. 16 13*

WANTED—Correspondence with a gentleman with capital and experience, to take an interest in erecting and running a spinning factory on moderate scale. J. E. S., Evening Shade, Lawrence Co., Ark.

CAUTION.—Beware of Imitations of Winans' Incrustation or Boiler Powder. This article has been successfully used for 12 years past, and is now largely pirated. A positively harmless and reliable remedy for incrustations. H. N. WINANS, 11 Wall st., N. Y.

WANTED—SAW MAKERS—Two first-class workmen accustomed to work on "big circulars," to whom good wages will be given, by FARLEY & SUNKER, 16 2] American Saw Works, Indianapolis, Ind.

DOUBLE MOTOR IN SAME SIZE, with same number of revolutions in the "Going Barrel." Keyhole for Hunter style; runs longer before it wears out of repair. Guaranteed. Must be sold before explained. Address J. MUMA, Hanover, Pa.

A GOOD INVESTMENT.
FOR SALE—An Entire Patent, recently granted, on a matter which promises an early and remunerative return. Address S. HODGINS & CO., No. 310 Olive st., St. Louis, Mo.

MILLING MACHINES—Of Improved Construction, great power, large capacity, unrivalled convenience of adjustment. Also, Pipe Vises, with and without extra jaw, and Vises of all sizes for heavy and light work. Send to Union Vise Company, of Boston, for illustrated circular. 16 5

THE BEST BOLT CUTTER IS MERRIMAN'S PATENT—Which cuts a full, smooth thread at once passing over the bolt. The dies revolve, are instantly adjustable to the slightest variation, and open to release the bolt. Foreign Patents for sale. Send for circulars. H. B. BROWN & CO., 16 tf] New Haven, Conn.

LE COUNT'S Patent Hollow Lathe Dogs,
6 Sizes, from ⅜ to 2 inches.....$8 8 00
12 Sizes, from ⅜ to 4 inches.....17 20
Improved Machinists' Clamps, 5 sizes.....11 00
Stout Boiler-makers' Clamps.....4 00
All with Steel Screws, and fitted. Send for circular
15 6m* C. W. LE COUNT South Norwalk, Ct.

FABRICATION OF VINEGAR.
Prof. H. DUSSAUCE, Chemist, is ready to furnish the most recent methods of manufacturing Vinegar by the slow and quick processes, with and without alcohol, directly from corn. Also, process to manufacture vinegar and acetic acid by distillation of wood. Methods of assaying vinegars. Address
1t*] New Lebanon, N. Y

QUICK RETURNS FOR YOUR MONEY.—A Rare Chance for investing Capital in a business promising 200 per cent, is offered on only a small outlay. Agents wanted to sell "Hodgins' Elastic Paper Collar Buttonhole." State and County Rights for sale. Samples sent on receiving twenty-five cents and a stamp. Address S. HODGINS & CO., No. 310 Olive st., St. Louis, Mo.

WANTED, an Agent—One chance in each town, worthy the attention of an active business man, to take the agency for the sale of Bradstreet's Rubber Molding and Weather Strips, applied to the sides, bottom, top, and center of doors and windows. The sale is beyond anything ever offered before to an agent, and from $10 to $25 per day can be made. Send for agent's circular. The first who apply secure a bargain. Terms for Molding, cash. J. B. BRADSTREET & CO., Boston, Mass. 16 13

PAPERS WANTED.—Persons having back Volumes of the Scientific American or American Artizan are requested to address Hudson & McCarty, Advertising Agents, 29 Park Row, N. Y., stating price, date, and No. of each Vol. 1*

WANTED.—Agents everywhere, Male or Female, to sell an article that is wanted in houses, stores, offices, factories, vessels, steamboats. Good inducements offered. Address J. J. PIKE & CO., Chelsea, Mass.

LABORATORY of INDUSURIAL CHEMistry.—Advices and Consultations on Chemistry applied to Arts and Manufactures, Metallurgy, etc. Plans of Factories, Drawings of Apparatus, Analysis and Commercial Assays. Informations on every kind of Chemical Fabrications. Address Prof. H. DUSSAUCE, Chemist, New Lebanon, N. Y. 1*

FOREMAN WANTED IN MACHINE SHOP, at the Bennington Machine Works, on or before January 1st, 1868. The right man can have a permanent situation, with good pay, and an interest in the business if required. One of the oldest and best concerns in the State; build Gunpowder and Paper Machinery; employ about 20 hands in Machine Shop; business about $100,000 per annum; Proprietors all mechanics. Address, immediately, for further information, O. & H. W. SCOTT. Bennington, Vt., Sept. 28, 1867. 16 tf

HIGHLY IMPORTANT FOR EVERY one.
A. BULLMANN'S Medicamental Elixer, examined, approved, and patented, by the United States Patent Office, and founded on 61 years experience
An infallible remedy for stomach cramps, bowel complaint, diarrhœa, biliousness, intermittent fever, weak, sick, or disordered stomach, pain in the forehead, offensive breath, itching piles, acrimony, worms, want of appetite, and all evils created by an unhealthy stomach; also a preventative and sure cure for cholera and sea sickness. Price $1 per bottle. For sale at 643 Fourth avenue, New York. Druggists, hotel keepers, and restaurants, allowed a liberal discount. Responsible agents wanted for every State in the United States. 16 1*

LARGE SALE OF PUBLIC PROPERTY.

Office of Army Clothing and Equipage, No. 18 State street, New York, Oct. 4, 1867.

WILL BE SOLD AT PUBLIC AUCtion, at the Depot of Army Clothing and Equipage, No. 400 Washington street, New York city, on TUESDAY, the 22d day of October, 1867, commencing at 11 o'clock A. M., to be continued from day to day, the following articles of Army Clothing and Equipage:

21,621	Woolen Blankets.	58,548	Stable Frocks.
7,211	Rubber do.	244,632	C. F. Drawers.
5,268	Do. Ponchos.	7,064	Domet. do.
68,435	Pegged Bootees, pairs.	15,440	Trowsers, horse.
83,125	Hand-s'w'd Bootees, pairs.	107,131	Forage Caps.
36,300	Hand-sewed Boots, pairs.	32,274	Unif. hats, unirim'd.
31,825	Pegged Boots, pairs.	21,396	Do. Infr. trimmed.
22,964	Great Coats, horse.	5,078	Do. Cav. trimmed.
165,592	Do. do. foot.	995	Do. Art. trimmed.
25,416	Gray flannel Shirts.	184,936	Great Coat Straps.
69,919	Domet Shirts.	18,408	Jackets, Cav. privates.
134	Unif. Coats, Art. Musicians.	8,385	Unif. Coats, Infr. do.
824	Jackets, Cav. do.	2,859	Do. do. Art. do.
262	Unif. Coats, Engineers.	277,413	Hat Cords, Infr.
26	Do. do. Ordnance.	400	Do. Hospital Stewards.
316	Do. do. Art. Music.	144	Eagles for Lt. Art. caps.
981	Do. do. Infr. do.	8	Tulips, do. do.
10,000	Musketo Bars.	227,112	Hat Eagles.
236,325	Knapsacks.	7,436	Do. Castles.
3,999	Do. Straps, sets.	4,062	Shells and Flames.
100,201	Haversacks, painted.	50,815	Crossed Sabers.
200	Do. unpainted.	42,686	Do. Cannon.
252,511	Canteens.	277,148	Hat Bugles.
4,226	Cotton Overalls.	29,797	Do. Cords, Cav.
1,949,158	Hat Numbers.	39,197	Do. do. Art.
19,499	Do. Feathers.	1,252,604	Do. Letters.
1,022	Do. Bugles, Non. Reg.	20	Do. Cord and Tassels.
1,000	Brass Scales, N.C.S., pairs.	450	Hospti. Stewds. Cap Wreaths.
4,595½	Brass Scales, Sergt's, pairs.	23	Knit Drawers.
100	Scale Buttons, pairs.	200	Unif. Coats. Infr., Boys.
434	Hosp. Stewards' Letters U.	425	Trowsers, foot, boys.
427	Hosp. Stewards' Letters S.	104	Pairs Bootees, do.
1,542	Scale Slides, pairs.	100	Shirts, flannel, do.
4,417	Cap Covers.	759	Gray Blue Great Coats, foot.
4,963	Files.	74	Trowsers, foot.
262	Rings for Lt. Art. Caps, pairs.	136	Trowsers, foot, gray blue.
21	Red Hair Plumes.	17	Talmas and Hoods.
13,008	Pickaxes.	150	Unif. Coats, Art. kersey.
16,825	Do. Handles.	14	Tarbans, Zouave.
16,886	Axes, felling.	968	Wall Tent Poles, sets.
6,000	Do. Handles.	15,806	Common do. do.
16,616	Do. Slings.	16,747	Hospital Tent Pins, large.
23,587	Hatchets.	13,506	Do. do. small.
24,999	Do. Handles.	378,043	Common do.
19,292	Do. Slings.	3,627	Wall do. large.
9,666	Spades.	2,698	Stoves for Sibley Tents.
1,544	Shovels.	108	Stoves for Sibley Tents and Pipe.
5,547	Stove Pipe, pieces of.	37,216	Prs. Chevrons.
2	Camp Color Staffs.	601,549½	yds. W'sted Lace.
25	Canteen Straps.	5	Hat Cords, Ordn'ce.
66,308	Mess Pans.	48,776	Leather N'k Stocks.
36,694	Camp Kettles.	35,912	Scales, corp'n and privates, pairs.
2	Sibley Tents.	51	Iron Pots.
47	Wall Tent Flies.	1,310	Machine Sewed Bootees, pairs.
5	Marque Tents.		
436	Hospt. Tent Poles, sets.		

Also, a quantity of irregular and damaged clothing and equipage. Samples of all can be seen at the Depot for ten days prior to the sale, and catalogues will be furnished on application at this office, or at the Depot, No. 400 Washington street.

Terms cash, in government funds; ten per cent down and the balance before the goods are taken from the depots. The goods must be removed from the depot within ten days from date of sale, under forfeiture of purchase and the ten per cent deposited.

By order of the Quartermaster-General,
C. G. SAWTELLE,
Bt. Brig.-Gen'l and Q'm'r U. S. A., in charge of Depot A. C. and E. 16 3

FOR SALE—Very superior upright Drills, New Friction Feed, materials and workmanship first class. Send for cut 2t BULLARD & PARSONS, Hartford, Conn

WHEEL MACHINERY,—Spoke Lathes, Hub Mortising, Boring, and Shaping Machines. Also, improved Tenoning Machines, made entirely of iron, easily adjusted to any size. Price $75. Address WM. BURLINGAME, Exeter, N. H.

JUST READY.....Price, $5 00
PROTEAUX'S PAPER MANUFACTURE.—The only practical Treatise of the kind ever published in the United States.
PRACTICAL GUIDE FOR THE MANUFACTURE OF PAPER AND BOARDS. By A. Proteaux, Civil Engineer, Graduate of the School of Arts and Manufactures, and Director of Thiers's paper mill, Puy-de-Dome. With additions by L. S. De Normand. Translated from the French, with notes, by Horatio Paine, A. B., M. D. To which is added a Chapter on the Manufacture of Paper from Wood in the United States, by Henry T. Brown, of the "American Artisan." Illustrated by six plates, containing Drawings of Raw Materials, Machinery, Plans of Paper Mills, etc., etc. 8vo.....$5 00.
Contents:—Chapter I. A glance and the history of paper making. Chapter II. Raw materials—rags. Chapter III. Manufacture—sorting and cutting; dusting; washing and boiling; reduction to half-stuff; drainage; bleeching; composition of the pulp; refining or beating; sizing; coloring matters; the work of the paper machine; finishing. Chapter IV. Manufacture of paper from the vat or by hand—manufacture of paper by hand; sizing; finishing; manufacture of bank-note paper and water-mark paper in general; comparison between machine and hand-made papers; classification of paper. Chapter V. Further remarks on sizing—of the sizing-room; method of extracting gelatin; operation of sizing; drying after sizing; the Dutch method preferable to the French; some important observations upon sizing; appendix upon sizing; theories of sizing; sizing in the pulp; M. Canson's method of sizing in the pulp; comparison of the two methods. Chap. VI. Different substances suitable for making paper—Straw paper; wood paper. Chap. VII. Chemical analysis of materials employed in paper-making—the waters; alkalimetrical test; examination of limes; chlorometric tests; examination of manganese; chlorometric degrees of samples of manganese; anti-chlorine; alums; kaolin; starch; coloring materials; fuel; examination of papers; materials of a laboratory. Chap. VIII. Working stock of a paper mill—motive power; rag cutter; dusters; washing apparatus; boiling apparatus; washing and beating engines; apparatus for bleeching and draining the pulp; paper machines; finishing machines; general working stock of a paper mill; general remarks upon the establishment of a paper mill; general remarks in reference to building; general considerations. Chapter IX. The manufacture of paper from wood in the United States. Chapter X. Manufacture of boards. Chap. XI. Manufacture of paper in China and Japan. Description of the Plates.

☞ The above, or any of my books sent by mail free of postage, at the publication price.

☞ My new Catalogue of Practical and Scientific Books, complete to June 1, 1867, sent free of postage to any one favoring me with his address.

HENRY CAREY BAIRD, Industrial Publisher, 16 1] 406 Walnut street, Philadelphia.

WOODWARD'S COUNTRY HOMES.

150 Designs and Plans for HOUSES of moderate cost. $1 50 post-paid.
Geo. E. Woodward, Publisher and Importer of ARCHITECTURAL BOOKS 191 Broadway, New York. Complete Catalogue sent free.

PAT. ERASER

PATENT INK ERASER, BURNISHER, Pencil Sharpener, and Pen Holder combined. Sells at sight. Agents wanted. Can make $50 a week. Sample, post paid, 25 cents, or two styles for 40 cents. Address MORSE ERASER CO., 15 4] 404 Library st., Philadelphia, Pa.

T. N. HICKCOX & CO., 280 Pearl street, New York, Manufacturers of Stamped Brass Goods, Patent Brass Mucilage Caps, Labels, etc., Stamping and Cutting Dies, Presses, and light machinery manufactured to order. Prompt attention paid to articles of new manufacture and patent goods. 14 4*

CAP AND SET SCREWS—All Kinds, of SUPERIOR QUALITY, By S. C. SMITH, Lowell, Mass. Send for Price List. 12 6*

SCHOOL OF ENGINEERING—St. Louis.—The Polytechnic Department of Washington University will open Oct. 1st, 1867. Applications for admission to the School of Civil and Mechanical Engineering should be made to CHANCELLOR WILLIAM CHAUVENET, St. Louis, Mo. Tuition $100 per year. 14 4

MACHINERY.—We have on hand, and can supply at short notice, Iron and Wood-working Machinery, new and second-hand; Steam Engines, Saw Mills, etc. General Agents for Judson's, Snow's, Pickering's, and other improved governors. HUTCHINGSONS & LAWRENCE, 14 4] No. 8 Dey st., New York.

TO MANUFACTURERS OF STEAM, WATER, AND GAS FITTINGS.—The undersigned is making improved Iron Lathes for the manufacture of large Steam Fittings, Globe and Safety Valves, Cocks, and Flanges—the only Lathes built expressly for this purpose. Also, Traverse Drills, Brass Lathes, Chucks, Rests and Patent Cast Iron Taper Reamers for Steam and Water Cocks. Steam Engines from 4 to 40-Horse, with Patent non-explosive Steam Generators. Address WM. BURLINGAME, Exeter, N. H.

SUPERIOR PATENT Engine Lathes, Upright Drills, Planer Centers which will swing 9, 15, 18, 22, and 24 inches, Heywood Patent Chair Lathes, Patterns and Models for all kinds of Light and Heavy Machinery, Iron Gear Cutting done, varying in diameter from ¼-in. to 5 feet, Cutlery Machinery from improved patterns, THOMAS IRON WORKS, 13 4*] Worcester, Mass.

FIRE-BRICK MANUFACTURERS.—I desire your correspondence (Interests concerned). Western Manufacturers' correspondence preferred. Address J. A. BAUSMAN, Brick maker, Boonsboro, Iowa.

DUNHAM'S Improved Nut-Forging Machine is unequaled in simplicity and durability, and the most perfect working machine in use. Rights for sale. Address [15 8*] GEO. DUNHAM, Unionville, Conn.

THE Excelsior Wind Mill and the Genuine Concord Axles manufactured by 15 26*] D. ARTHUR BROWN & CO., Fisherville, N.H.

ANVILS.—Peter Wright's Patent Anvils, 230 to 500 lbs. each, for sale very low by A. PURVES & SON, 15 4] South and Penn sts., Philadelphia.

BELTING—One Roll (150 feet) 18-in. Double Leather Belting for sale low by A. PURVES & SON, 15 2] South and Penn sts., Philadelphia.

TURBINE WATER WHEELS.—Luther's Direct and Reacting Turbine Wheels manufactured and for sale by the NOVELTY IRON WORKS Foot of East 12th st., N. Y. Send for Circular. 13 25*

LOOK HERE!—Don't fail to send for Illustrated circular of Robbins' Alarm Money Drawer. Agents are making from 15 to 30 dollars per day. Address ROBBINS, FRONTZ & CO., Hughesville, Lycoming county, Pa. Patented Sept. 3d, 1867. 15 2*

FUEL Economized and Power Increased by CARVALHO'S PAT. STEAM SUPER HEATER. Guaranteed to remedy "priming," save a large percentage of fuel, and furnish pure, dry steam, of any required temperature. Is easily attached to boilers, very durable, and pays for itself in a few months. Address HENRY W. BULKLEY, General Agent, 70 Broadway, N. Y. 13 12*

STEAM ENGINES WITH NON EXPLOSIVE STEAM GENERATORS
2 15 Horse-Power, with Generators.
2 10 " " "
2 10 " " second-hand.
4 5 " " with or without Generators.
The above Engines, after a severe test as to power and economy, took the highest prize (Gold Medal,) at the Mechanics' Fair in Boston, and medal at Fair of American Institute, New York. Just the Engine to send West or South, being easily packed in small space, without danger of breaking. Address WM. BURLINGAME, Exeter, N. H.

PRANG'S AMERICAN CHROMOS
Imitations of Oil Paintings.
Published by L. PRANG & CO., Boston.
Sold in all Picture Stores. Send for Catalogue 15 4

THE AMERICAN TURBINE WATER WHEEL, Patented by Stout, Mills, and Temple, possesses new and valuable improvements, and remedies defects which exist in all other Turbine wheels. Per cent of power guaranteed to be equal to any overshot wheel. For descriptive circulars address OLIVER & CO., 1 *] Agents, 55 Liberty street, New York.

WANTED—AGENTS—$75 to $200 per month, everywhere, male and female, to introduce throughout the United States, the GENUINE IMPROVED COMMON SENSE FAMILY SEWING MACHINE. This machine will stitch, hem, fell, tuck, quilt, bind, braid, and embroider in a most superior manner. Price only $18. Fully warranted for 5 years. We will pay $1,000 for any machine that will sew a stronger, more beautiful, or more elastic seam than ours. It makes the "Elastic Lock Stitch." Every second stitch can be cut, and still the cloth cannot be pulled apart without tearing it. We pay agents from $75 to $200 per month and expenses, or a commission from which twice that amount can be made. Address SECOMB & CO., Cleveland, Ohio. CAUTION.—Do not be imposed upon by other parties palming off worthless cast-iron machines, under the same name or otherwise. Ours is the only genuine and really practical cheap machine manufactured. 15 4

STEEL SPRINGS (Patent Tempered) Manufactured by J. F. DUBBER, 181 Broadway, N. Y. 2*

FOR the Best Spoke Machinery, address the Manufacturer, J. GLEASON, 1020 Germantown avenue, Philadelphia, Pa. 15 5*

PARTIES Making or having a wood surfacing planer that works about 7 inches thick, address, with circular D. A. KELLEY, Pawtucket, R. I. 15 2*

JUST PUBLISHED—THE INVENTOR'S and MECHANIC'S GUIDE.—A new book upon Mechanics, Patents, and New Inventions. Containing the U. S. Patent Laws, Rules and Directions for doing business at the Patent Office; 113 diagrams of the best mechanical movements, with descriptions; the Condensing Steam Engine, with engraving and description; How to Invent; How to Obtain Patents; Hints upon the Value of Patents; How to sell Patents; Forms for Assignments; Information upon the Rights of Inventors, Assignees and Joint Owners; Instructions as to Interferences, Reissues, Extensions, Caveats, together with a great variety of useful information in regard to patents, new inventions and scientific subjects, with scientific tables, and many illustrations. 108 pages. This is a most valuable work. Price only 25 cents. Address MUNN & CO. 37 Park Row, N. Y.

A MESSIEURS LES INVENTEURS—Avis important. Les inventeurs non familiers avec la langue Anglaise, et qui préféreraient nous communiquer leurs inventions en Français peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront reçus en confidence. MUNN & CO., Scientific American Office, No. 37 Park Row, N. Y.

SNOW'S PATENT
SAFETY GOVERNOR AND VALVE
COMBINED.

GLEN & HALL, Rochester, N. Y.,

Sole Manufacturers.

See engraving and description in Scientific American Sept. 28, 1867.

This Governor has been in general use upon Engines, driving all kinds of machinery during the last seven years, and is admitted, by all who have seen it operate, to be unsurpassed as an engine regulator. Yielding, as it does, to the slightest change in the speed of the piston, it produces an easy and elastic movement of the engine, and has been used in many cases requiring great accuracy, where other leading governors have failed.

In addition to its value as a regulator, it has the safety feature, whereby it cannot fail to shut off the steam and stop the engine the moment it is deprived of its rotary motion by parting or slipping off of the belt, or other accident. It thus prevents the injury to engine and destruction of machinery attached which often follows accidents of this character. They are very ornamental in their model, simple in construction and action, thoroughly finished, and durable. We make them of all sizes, adapted to engines of the largest and smallest capacities.

☞ So great is our confidence in this Governor, that we offer to Engine Builders and Machinists, unacquainted with its merits, to furnish them one or more at our lowest trade price, and if, after thorough trial, they do not prove entirely satisfactory, they may be returned and the money paid, with the freight, will be refunded. Descriptive circulars and price lists sent free to all applicants.

Address GLEN & HALL,
13 20o28t] Rochester, N. Y.

AMERICAN EMERY.

ANOWSIC EMERY, Manufactured at Bath, Me. All numbers from four up to one hundred and twenty. The only real mine in the world, excepting in Turkey. For sale in quantities to suit, at reduced prices, by STANWOOD, McLELLAN & FULLER,
24 Central street, Boston.

From Stanly Rule and Level Co., New Britain, Conn.

"We have been using some numbers of your Emery on steel, and it gives good satisfaction. If it proves to work as on trial, thus far, we shall use nothing else. For some reason, London emery does not give us good satisfaction on steel.

Bristol, Conn.:

Our men, who work by the job, say your Emery is better than any English or American Emery they ever used.

Mackintosh Hemphill Co., Pittsburgh, Pa.:

The quality of your Emery Cloth is excellent. 15 13

A. FESQUET, Chemist and Engineer, Construction of Chemical Works, Assays and Analyses, Advice, Reports, Drawings, etc., on the Arts and Manufactures, 1322 Marshall street, Philadelphia, Pa. 14 5*

SNOW PLOW FOR RAILROADS.

THE Subscriber wishes to sell State, or the entire Right in his Patent Snow Plow. It has been tested on Western Railroads, and works satisfactorily. This plow is light, simple, and efficient, and is not liable to be injured by use. It requires to be set close on the rail to work well. It can be raised or lowered very easily, and when raised, it will be about fifteen inches from the rail. It will remove anything loose, or half-frozen snow or mud, and will prevent persons from getting caught under the wheels. The parts liable to wear can be replaced at a small cost. For price, or further particulars, address JAS. SHERIDAN,
No. 2026 Carr st., St. Louis, Mo.

A model may be seen at the office of the Scientific American. 15 3*

TODD & RAFFERTY, Manufacturers and DEALERS IN MACHINERY.
Works, Paterson, N. J.; Warerooms, 4 Dey st., New York. Steam Engines and Boilers, Steam Pumps, Machinists' Tools. Also, Flax, Hemp, Tow, and Rope Machinery; Snow's and Judson's Governors, Second-hand Machinery.

R. P. ROTHWELL,

MINING Engineer and Metallurgist, member of the Geological Society of France, etc.
Office.....Wilkesbarre, Pa.

Particular attention paid to examining and reporting on Gold, Tin, Copper, Iron, Coal, and all other kinds of mineral property, and to the establishment of mines and metallurgical works in any part of the country. Ores assayed. 12 6eow*

BODINE'S JONVAL TURBINE WATER Wheel, combining great economy in the use of water, simplicity, durability, and general adaptation to all positions in which water can be used as a motive power.

The undersigned manufacturers of the above wheel are prepared to furnish and warrant the same to give more power than any overshot or other turbine wheel made using the same amount of water. These wheels have been tested with all the wheels of note in the country, and have never failed to prove their superiority. We therefore propose to put them in for any responsible party, warranting them to work up to our representations, failing in which we will take them out at our own expense. The attention of millwrights is invited to this wheel. Agents wanted in every county in the United States and Canadas. Send for descriptive circular. J. H. BODINE & CO.,
12 tf eow] Mount Morris, New York.

PEIRCE'S STONE SURFACE,—
AN ANTI-OXIDIZER,
For Coating Iron Railings, Boilers, and Iron Work of all descriptions; Also, Oil Tanks, Acid Tanks, etc.

This surface has been put to the most severe Chemical tests, and has been proved to resist all change or decomposition. As an Anti-Oxidizer it has no equal; never cracks or scales off. Iron coated with this surface will not corrode, even in salt water. Manufactured by
I. NEWTON PIERCE & CO.,
14 6eow*] 427 North Eleventh st., Philadelphia, Pa.

GILLESPIE HYDRAULIC GOVERNOR for Water Wheels.—The only Governor that, on a change of labor, moves the gate instantly to the required point, AND STOPS—gives an evenness of speed not excelled by the best steam engine; operates the largest gates with ease; saves a large per centage of repairs, and insures against accidents from breaking of shafts or belts. Entire satisfaction guaranteed. Send for circular.
JOHN S. ROGERS, Treas. Gillespie Governor Co.,
1 10eow] 13 Kilby street, Boston, Mass.

PLATINUM—For all Laboratory and Manufacturing purposes. Platinum Scrap and Ore Purchased. H. M. RAYNOR, Office 748 B'dway, N. Y. 8 10*eo

MODELS and all kinds of Brass Work made at J. GAIR'S, 8 Gold st., near Maiden Lane. 9 6eow*

SPICE CAN AND BLACKING BOX Makers, send for circular of Painter's Patent Riveting device, dispensing with solder. Great economy. 30 Machines in use.
W. PAINTER & CO.,
13 cow5*] 45 Holliday street, Baltimore.

TO MANUFACTURERS OF TEXTILE Fabrics.—Dutcher's Patent Temples, adapted to weaving all kinds of goods; also, Thompson's Patent Oil Cans for oiling Machinery—neat and economical; also, Patent Shuttle Guides, which will protect the weaver and save the owner the cost of the guides every year. Furnished by E. D. & G. DRAPER,
13 13eow*] Hopedale, Mass.

ALCOTT'S CONCENTRIC LATHES.—For Broom, Hoe, and Rake Handles, Chair Rounds, etc., and all other kinds of Wood-working Machinery, for sale by S. C. HILLS, 12 Platt street, New York. 3 6* b

OIL! OIL!! OIL!!!

FIRST PREMIUM.....PARIS, 1867.

EXPOSITION UNIVERSELLE!

PEASE'S IMPROVED OILS!

Acknowledged the Best in the World! The Highest Award ever all others!

Grand Silver Medal and Diploma!

The **Only One** to the United States awarded to

F. S. PEASE,

For the Greatest Excellence in Oils for Lubricating and Burning.

London,.....1862.

WORLD'S FAIR—TWO PRIZE MEDALS

Awarded to **F. S. PEASE** for Improved Engine, Signal, Lard, and Premium Petroleum, as the **Best made!**

These Improved Oils cost no more than many of the common oils in market, while they are endorsed by the greatest experience and highest authority in the United States and Europe, and offered to the public upon the most thorough, reliable, and practical tests as the Best Oils made for

Railroads, Steamers, and for Machinery and Burning.

F. S. PEASE, Oil Manufacturer,
Nos. 61 and 63 Main street, Buffalo, N. Y.
N B.—Reliable orders filled for any part of the world. 10 tf

THE HYDRAULIC, AUTOMATIC CLOTHES WASHER AND BOILER,
Patented by Rev. M. W. Staples, saves time, labor, clothes, and money. No acids used; water, soap, and steam do the work. It costs but little, is very simple, and purely philosophical in its working. Send for circular. Rev. Dr. John Woodbridge, of Saratoga, says:—"It accomplishes all that Mr. Staples claims for it." Rev. Geo. J. Means, of Howells, N. Y., says:—"It saves full one-half the labor of washing." E. Waters, of Troy, says:—"A great labor-saving invention, and worth for every large washing half its cost in the saving of the wear and tear of clothing."
State and County Rights for sale by
WIGHT & CO.,
Sole Agents for Patentee,
14 3*] Gurley's Building, Troy, N. Y.

PRICES REDUCED.—Iron-frame Tenon Machines, extra heavy, double cylinders and double copes, $380, formerly $375. 26 in. "Farrar" Planers, large size, with extension, $525, formerly $600. Woodworth & Daniels' Planers, Power and Foot Mortisers, and all other wood-working machinery made by us, reduced in price in the same proportion as the above. Send for cuts and prices to
STEPTOE, McFARLAN & CO.,
Manufacturers of Wood-Working Machinery and Machinists Tools, Cincinnati, Ohio. 13 4*

ALUMINUM PLATE AND BAR Imported and for sale in any quantity. SAMUEL S. WHITE, Dental Depot 707 and 709 Broadway. 13 4*

PATENT SHINGLE, STAVE, AND Barrel Machinery, Comprising Shingle Mills, Heading Mills, Stave Cutters, Stave Jointers, Shingle and Heading Jointers, Heading Rounders and Planers, Equalizing and Cut-off Saws. Send for Illustrated List.
FULLER & FORD,
9 tf] 282 and 284 Madison street, Chicago, Ill

MOLDING CUTTERS MADE to Order—Send for circular to WM. H. BROWN,
10 10*] 44 Exchange st., Worcester, Mass.

CAMDEN TUBE WORKS CO, Manufacturers of all sizes of WROUGHT-IRON WELDED TUBE AND STEAM GAS FITTERS AND TUBE MANUFACTURERS' TOOLS, viz: Pease's Improved Gas Pipe Screwing and Cutting-off Machines of various sizes for both Steam and Hand Power; No. 3, machine screws and cuts off from ⅛ to 2-inch pipe; No. 4, machine screws and cuts off from ⅛ to 4-inch pipe; No. 5, machine screws and cuts off from ⅛ to 6 inch pipe; also, screwing stocks, dies, taps, reamers, drills, ratchet drills, pipe cutters, pipe tongs, and pipe vises. No. 1, holds from ⅛ to 2-inch pipe, price $15; No. 2 holds from ⅛ to 4-inch pipe, price $25. Pease's patent pipe clamp which fits on an ordinary vise and holds from ⅛ to 2-inch pipe, price $5. Pease's patent screwing stocks, No. 1, stock and dies, screws, ¼ ⅜ ½ and ¾ pipe, price $10; No. 2, stock and dies, screws, 1 1¼ 1½ and 2-inch pipe, $30; No. 3, stock and dies, both screws and cuts off 2½ 3 3½ and 4, $50. Pease's patent adjustable pipe tongs which for strength and durability are warranted superior to anything of the kind in the market; No. 1 grips ⅛ ¼ ⅜ ½ and 1-inch pipe and sockets, price $4; No. 2, grips 1 1¼ 1½ and 2-inch pipe and sockets, $7; No. 3 grips 2½ 3 3½ and 4-inch pipe and sockets, $14.

☞ Any of the above tools will be sent by express free of charge C. O. D. at above rates by addressing
CAMDEN TUBE WORKS,
7 13*] Second and Stevens streets, Camden, N. J.

PRATT, WHITNEY & CO., Manufacturers of First-class Machinists' and Gun Tools, Engine Lathes, with Slate's Patent Taper Attachment, Stannard's Patent Hydraulic Engines for High Pressure and Special Machinery. Send for circulars, Hartford, Ct. 8 13*

THE FUEL SAVING FURNACE CO., No. 205 BROADWAY N. Y.
15 cuteow tf

IMPORTANT TO MANUFACTURERS of Barrels and Shippers of Oil, Spirits, or Alcohol. Merrill's improved Tongued, Grooved and Cemented joint barrels have proved to be the only reliable and perfectly tight barrel for shipping and storing oil, spirits, or alcohol. Oil has been shipped in this package to tropical climates and to Europe, landing their contents entire and they will hold, for any length of time, petroleum or spirits without loss. Their cost is but a trifle more than the common barrel, the machinery required being simple and not costly. For shop or territorial rights to manufacture and all information regarding them, apply to
JOSHUA MERRILL,
6 13*] 108 Water street, Boston, Mass.

MILL-STONE DRESSING DIAMONDS Set in Patent Protector and Guide. Sold by JOHN DICKINSON, Patentee and Sole Manufacturer, and Importer of Diamonds for all mechanical purposes; also, Manufacturer of GLAZIERS' DIAMONDS, No. 64 Nassau street, New York City. Old diamonds reset. N. B.—Send postage stamp for descriptive circular of the Dresser. 9 12*

WANTED—Ladies and Gentlemen everywhere, in a business that will pay $5 to $20 per day; no book, patent right, or medical humbug, but a standard article of merit, wanted by everybody, and sold at one third the usual price, with 200 per cent profit to our agents. Samples and circulars sent by mail for 25 cents.
13 8*-D] WHITNEY & SON, 6 Tremont st., Boston, Mass.

MORSE PATENT STRAIGHT-LIP INCREASE TWIST DRILL.—Sizes from 3-100 to 2 inches. Drills of extra length made to order with straight shanks, or tapered to fit any sockets, by Morse Twist Drill and Machine Company,
S. A. MORSE, Supt.,
9 13*] New Bedford, Mass.

STEAM ENGINES—Superior in Construction, with Sault's Patent Frictionless Slide Valve, the most complete and economical Engine for Manufacturing purposes. Address
10 13*] M. & T. SAULT, New Haven, Conn.

GROVER & BAKER'S HIGHEST PREMIUM ELASTIC Stitch Sewing Machines, 495 Broadway, N. Y. 1 tf

SETS, VOLUMES AND NUMBERS. Entire sets, volumes and numbers of SCIENTIFIC AMERICAN (Old and New Series) can be supplied by addressing A. B. C., Box No. 773, care of MUNN & CO., New York.

HOYT BROTHERS' Patent Stretched, Patent Jointed, and Patent Riveted Leather Banding. These Bands are warranted to run straight and maintain a perfect bearing on the pulleys. They are made from the center part, only, of the hide, tanned whole for the purpose, in the best of oak bark, and stretched, both wet and dry, by power machines.
13 14*] HOYT BROTHERS, 28 & 30 Spruce st., N. Y.

AGENTS WANTED—To sell our Patent Measuring Faucet. Send for circulars. Enterprise Manufacturing Co., of Pennsylvania, 130 Exchange Place, Philadelphia. 14 8*

PAPER-BAG MACHINES, and STATE Rights to use, for sale by B. S. BINNEY,
10 13] 64 Kilby st., Boston, Mass.

PORTABLE STEAM ENGINES, COMbining the maximum of efficiency, durability, and economy with the minimum of weight and price. They are widely and favorably known, more than 600 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address
J. C. HOADLEY & CO., Lawrence, Mass. 1 tf

DOUGLASS MANUFACTURING CO. Exclusive Manufacturers of
COOK'S PATENT
BORING IMPLEMENTS.
Also, a complete assortment of
MECHANICS' TOOLS.

Framing Chisels, Socket Firmer Chisels and Gouges, Socket Paring Chisels, Drawing Knives, Screwdrivers Augers and Bits, Bung Borers, Boring Machines, Gimlets, Firmer Chisels and Gouges, Hollow Augers, Corkscrews, etc.
Warehouse, 70 Beekman street, New York. 10 tf

MODELS, PATTERNS, EXPERIMENTAL and other Machinery, Models for the Patent Office, built to order by HOLSKE MACHINE CO., Nos. 536, 540, and 542 Water street, near Jefferson. Refer to SCIENTIFIC AMERICAN Office. 1 tf

WATER WHEELS.—
1 tf] The Helical Jonval Turbine is manufactured by J. E. STEVENSON, 40 Dey street, New York.

CHARLES A. SEELY, CONSULTING and Analytical Chemist, No. 26 Pine street, New York. Assays and Analyses of all kinds. Advice, Instruction, Reports, etc., on the useful arts. 1 tf

AIR SPRING FORGE HAMMERS ARE made by CHAS. MERRILL & SONS, 256 Grand street, New York. They will do more and better work, with less power and repairs, than any other Hammer. Send for a circular. 1 tf

THE
HARRISON BOILER
Is the only one now offered for sale entirely FREE from
DESTRUCTIVE EXPLOSION.

Twenty thousand horse-power have been made and put in operation within the last three years, with a constantly increasing demand. For descriptive circulars and price apply to the Harrison Boiler Works, Philadelphia, Pa., or to J. B. HYDE, Agent,
6 tf] Offices 9 and 10, No. 119 Broadway, N. Y.

A PRIZE MEDAL of The Paris Exhibition was awarded to
SHAW & JUSTICE
for their
DEAD STROKE POWER HAMMER.

The great satisfaction given by these Hammers wherever introduced, warrants the Patentee in asserting them to be THE BEST, as well as the most economical Hammer in use. They are made of sizes suitable for forging iron from 10 in. to ¼ in. square, and are employed in manufacturing axles for locomotives as well as carriages; also, for axes, hatchets, hoes, shovels, agricultural implements, table cutlery, and die work generally, with equal success. For State Rights (not sold) and Hammers, address the Patentee, [4 6m] PHILIP S. JUSTICE,
14 North 5th street, Philadelphia, or 42 Cliff st., New York.

GREAT ECONOMY IN FUEL.—The Washington Iron Works' New Steam Engine, with Variable Cut-off, worked by the Governor patented by Wm. Wright, Oct. 1866, is the most perfectly simple and economical Engine yet introduced, saving 50 per cent in fuel. This engine takes the lead of all others, and is being put in in different parts of New England, this city, Philadelphia, and in the principal manufacturing districts of the country. For information address
WASHINGTON IRON WORKS,
Newburgh, N. Y.,
Or apply at the office of the Company, 57 Liberty st., New York City. Circulars sent to order. 9 tf

STEAM ENGINES.—COOK, RYMES & Co.'s celebrated first-class stationary, portable and hoisting engines constantly on hand, at their warerooms, 107 Liberty street, New York. 11 tf

CAN I OBTAIN A PATENT?—For Advice and instructions address MUNN & CO., 37 Park Row New York for TWENTY YEARS Attorneys for American and Foreign Patents. Caveats and Patents quickly prepared. The SCIENTIFIC AMERICAN $3 a year; 30,000 Patent cases have been prepared by M. & Co.

THE "McGOWAN" AND "BUCKEYE" Patterns Double-acting Hand and Power Pumps. Patented 1865. For railroads, factories, mills, etc. Agents wanted in every town and village.
McGOWAN BROTHERS, Manufacturers,
Cincinnati, Ohio. Send for catalogue. 3 13*

FOR ENGINE BUILDERS' AND STEAM Fitters' Brass Work, address F. LUNKENHEIMER,
10 26*] Cincinnati Brass Works.

FOR ROCK-DIGGING AND WALL-Laying Machines, address O. L. SHELDON,
8 16*] Hartsville, Mass.

WHEELER & WILSON, 625 BROADway, N. Y.—Lock-stitch Sewing Machine and Button-hole do. 1f

SHEET AND ROLL BRASS, BRASS AND COPPER WIRE, GERMAN SILVER, etc., Manufactured by the
THOMAS MANUFACTURING CO.,
Thomaston, Conn.
Special attention to particular sizes and widths for Type Founders, Machinists, etc. 2 26*

PECK'S PATENT DROP PRESS—Is manufactured solely by MILO PECK & CO.,
13 6*] 304 Elm street, New Haven, Conn.

WOODWORTH PLANERS A SPECIALTY—From new patterns of the most approved style and workmanship. Wood-working Machinery generally. Nos. 24 and 28 Central, corner Union street, Worcester, Mass.
12 15*tf] WITHERBY, RUGG & RICHARDSON.

BUERK'S WATCHMAN'S TIME DETECTOR.—Important for all large Corporations and Manufacturing concerns—capable of controlling with the utmost accuracy the motion of a watchman or patrolman, as the same reaches different stations of his beat. Send for a Circular. J. E. BUERK,
P. O. Box 1,622, Boston, Mass.
N. B.—This detector is covered by two U. S. patents. Parties using or selling these instruments without authority from me will be dealt with according to law. 8 19*

IMPORTANT.
A MOST VALUABLE MACHINE for all kinds of irregular and straight work in wood, called the Variety Molding and Planing Machine, indispensable to competition in all branches of wood-working. Our improved guards make it safe to operate. Combination collars for cutters, saving 100 per cent, and feed table and connection, for waved moldings and planing, place it above all others. Evidence of the superiority of these machines is the large numbers we sell, in the different states, and parties laying aside others and purchasing ours, for cutting and shaping irregular forms, sash work, etc.

We hear there are manufacturers infringing on some one or more of our nine patents in this machine. We caution the public from purchasing such.

All communications must be addressed "Combination Molding and Planing Machine Company, Post-office Box 5230, New York. All our machines are tested before delivery, and warranted.

Send for descriptive pamphlet. Agents solicited. 14 tf

TO IRON FOUNDERS.—By using the waste heat from a Cupola Furnace, connected with a Harrison Boiler, a saving of the entire cost of fuel for the blast can be guaranteed.

As thus applied, it may be seen daily in operation from 2 to 5 o'clock, p. m., at the Harrison Boiler works, Gray's Ferry Road, Philadelphia, Pa. J. B. HYDE, Agent,
12 tf 119 Broadway, New York.

RICHARDSON, MERIAM & CO., Manufacturers and Dealers in DANIELL'S AND WOODWORTH PLANERS. Boring, Matching, Molding, Mortising and Tenoning Machines, Scroll, Cut-off, and Slitting Saws, Saw Mills, Saw Arbors, Spoke and Wood-turning Lathes, and other wood working Machinery. Warehouse, 107 Liberty street, New York. Manufactory, Worcester Mass. 11 tf

PATENT POWER AND FOOT-PUNCHING PRESSES, the best in market, manufactured by W. C. STILES & CO., West Meriden, Conn. Cutting and Stamping Dies made to order. Send for Circulars. 14 tf

FOR FIRST-CLASS SHAFTING WITH Patent Self-oiling Boxes and adjustable Hangers, also Mill Work and special machinery, address
1 tf] BULLARD & PARSONS, Hartford, Conn.

WOOD, LIGHT & CO.—MANUFACturers of Machinists' Tools and Naysmyth Hammers. Lathes from 4 to 30 feet long, and from 15 to 100 inches swing. Planers from 24 to 60 inches wide and from 4 to 46 feet long. Upright Drills. Milling and Index Milling Machines. Profile or Edging Machines. Gun Barrel Machines Shafting, Mill Gearing, Pulleys and Hangers, with Patent Self-oiling Boxes.
Works, Junction Shop, Worcester, Mass.
Warehouse at 107 Liberty street, New York. 11 tf

PRESSURE BLOWERS—Equal in Force to Piston Blowers, and a perfect substitute for both Fan and Pistons—running more easily than either. Adapted for Blast, and Cupola, and Heating Purposes, Forges Steamships, Boilers, Ventilation, etc., etc. Prices according to sizes, ranging from $25 to $1,500. Address, for Circular B. F. STURTEVANT,
14 tf 71 Sudbury street, Boston, Mass.

THE CELEBRATED "SCHENCK" WOODWORTH PLANERS, WITH NEW AND IMPORTANT IMPROVEMENTS, Manufactured by the
SCHENCK MACHINE CO., MATTEAWAN, N. Y.
JOHN B. SCHENCK, President.
T. J. B SCHENCK, Treas. 14 tf

IRON PLANERS, ENGINE LATHES, Drills, and other Machinists' Tools, of Superior Quality, on hand and finishing. For Sale Low. For Description and Price, address NEW HAVEN MANUFACTURING CO., New Haven, Ct. 14 tf

LATHE CHUCKS—HORTON'S PATENT—from 4 to 36 inches. Manufacturer's address, E. HORTON & SON, Windsor Locks, Conn. 1 26*.

ANDREWS'S PATENT PUMPS, ENGINES, etc.—
CENTRIFUGAL PUMPS, from 20 Gals. to 40,000 Gals. per minute, capacity.
OSCILLATING ENGINES (Double and Single), from 2 to 250 horse-power.
TUBULAR BOILERS, from 2 to 30 horse-power, consume all smoke.
STEAM HOISTERS to raise from ¼ to 6 tons.
PORTABLE ENGINES, 2 to 20 horse-power.
These machines are all first-class, and are unsurpassed for compactness, simplicity, durability, and economy of working. For descriptive pamphlets and price list address the manufacturers, W. D. ANDREWS & BRO.,
1 tf 414 Water street N. Y.

PHOENIX IRON WORKS—
Established 1834.
GEO. S. LINCOLN & CO.,
Iron Founders and Manufacturers of Machinists' Tools on short notice. Samples may be seen in our Wareroom. Also, we have constantly on hand our Patent FRICTION PULLEY, Counter Shafts for Lathes, etc. 15 tf

MASON'S PATENT FRICTION CLUTCHES, for starting Machinery, especially Heavy Machinery, without sudden shock or jar, are manufactured by VOLNEY W. MASON,
14 tf] Providence, R. I.

FAY'S PATENT WATER-PROOF Roofing Paper, etc. Send red stamp for Circular and sample of Paper. C. J. FAY,
13 13*] Second and Vine streets, Camden, N. J.

PORTABLE AND STATIONARY Steam Engines and Boilers, Circular Saw Mills, Mill Work, Cotton Gins and Cotton Gin Materials, manufactured by the ALBERTSON & DOUGLASS MACHINE CO., New London, Conn. 14 tf

$200 A MONTH IS BEING MADE with our IMPROVED STENCIL DIES, by Ladies and Gentlemen. Send for our free Catalogue containing Samples and Prices. Address
9 tf—H. S. M. SPENCER & CO., Brattleboro, Vt.

SCHOOL OF MINES,
COLUMBIA COLLEGE.
Instruction in Mining, Engineering, Metallurgy, Assaying, Analytical Chemistry, etc. Re-opens Oct. 7. Examination for admission for degree of Engineer of Mines, Oct. 3d. For Catalogues and requirements for admission apply to C. F. CHANDLER,
Dean of Faculty,
East 49th street, New York. 7 13*

NITRO-GLYCERIN.—UNITED STATES BLASTING OIL CO.—We are now prepared to fill all orders for Nitro-Glycerin, and respectfully invite the attention of Contractors, Miners and Quarrymen to the immense economy in the use of the same. Address orders to JAMES DEVEAU, Sec.,
1 28*] 32 Pine street, New York

ERICSSON CALORIC ENGINES OF GREATLY IMPROVED CONSTRUCTION.—Ten years of practical working by the thousands of these engines in use, have demonstrated beyond cavil their superiority where less than ten horse-power is required. Portable and Stationary Steam Engines, Grist and Saw Mills, Cotton Gins, Air Pumps, Shafting, Pulleys, Gearing, Pumps, and General Jobbing. Orders promptly filled for any kind of Machinery. JAMES A. ROBINSON,
1 tf—D] 166 Duane street, cor. Hudson, New York.

R. BALL & CO., SCHOOL STREET, WORCESTER, MASS., Manufacturers of Woodworth's, Daniell's, and Gray & Wood's Planers, Sash Molding, Tenoning, Mortising, Upright and Vertical Shaping, Boring Machines, Scroll Saws, and a variety of other Machines and articles for working wood.
Send for our illustrated Catalogue. 1 25*

MACHINE CARD CLOTHING.—SARGENT CARD CLOTHING CO., Manufacturers of Cotton, Wool, and Flax Machine Card Clothing of every variety. E. S. LAWRENCE, Supt., Worcester, Mass. Sargent & Co., Agents, 70 Beekman street New York. 25 20*

PATENTS

The First Inquiry that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A *positive* answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

If the parties consulted are honorable men, the inventor may safely confide his ideas to them: they will advise whether the improvement is probably patentable, and will give him all the directions needful to protect his rights.

Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN, have been actively engaged in the business of obtaining patents for over twenty years—*nearly a quarter of a century*. Over Fifty thousands inventors have had benefit from our counsels. More than one third of all patents granted are obtained by this firm.

Those who have made inventions and desire to consult with us, are cordially invited to do so. We shall be happy to see them in person, at our office, or to advise them by letter. In all cases they may expect from us an *honest opinion*. For such consultations, opinion, and advice, *we make no charge*. A pen-and-ink sketch, and a description of the invention should be sent, together with stamps for return postage. Write plainly, do not use pencil nor pale ink; be brief.

All business committed to our care, and all consultations, are kept by us *secret and strictly confidential*. Address MUNN & CO., 37 Park Row, New York.

Preliminary Examination.—In order to obtain a Preliminary Examination, make out a written description of the invention in your own words, and a rough pencil or pen-and-ink sketch. Send these with the fee of $5 by mail, addressed to MUNN & CO., 37 Park Row, and in due time you will receive an acknowledgment thereof, followed by a written report in regard to the patentability of your improvement. The Preliminary Examination consists of a special search, which we make with great care, among the models and patents at Washington to ascertain whether the improvement presented is patentable.

In Order to Apply for a Patent, the law requires that a model shall be furnished, not over a foot in any dimensions,—smaller, if possible. Send the model by express, pre-paid, addressed to Munn & Co., 37 Park Row, N. Y., together with a description of its operation and merits. On receipt thereof we will examine the invention carefully and advise the party as to its patentability, free of charge.

The model should be neatly made of any suitable materials, strongly fastened, without glue, and neatly painted. The name of the inventor should be engraved or painted upon it. When the invention consists of an improvement upon some other machine, a full working model of the whole machine will not be necessary. But the model must be sufficiently perfect to show, with clearness, the nature and operation of the improvement.

New medicines or medical compounds, and useful mixtures of all kinds, are patentable.

When the invention consists of a medicine or compound, or a new article of manufacture, or a new composition, samples of the article must be furnished, neatly put up. Also, send us a full statement of the ingredients, proportions mode of preparation, uses, and merits.

Reissues.—A reissue is granted to the original patentee, his heirs, or the assignees of the entire interest, when by reason of an insufficient or defective specification the original patent is invalid, provided the error has arisen from inadvertence, accident, or mistake, without any fraudulent or deceptive intention.

A patentee may, at his option, have in his reissue a separate patent for each distinct part of the invention comprehended in his original application, by paying the required fee in each case, and complying with the other requirements of the law, as in original applications.

Each division of a reissue constitutes the subject of a separate specification descriptive of the part or parts of the invention claimed in such division; and the drawing may represent only such part or parts. Address MUNN & CO., 37 Park Row, for full particulars.

Interferences.—When each of two or more persons claims to be the first inventor of the same thing, an "Interference" is declared between them, and a trial is had before the Commissioner. Nor does the fact that one of the parties has already obtained a patent prevent such an interference; for, although the Commissioner has no power to cancel a patent already issued, he may, if he finds that another person was the prior inventor, give him also a patent, and thus place them on an equal footing before the courts and the public

Caveats.—A Caveat gives a limited but immediate protection, and is particularly useful where the invention is not fully completed, or the model is not ready, or further time is wanted for experiment or study. After a Caveat has been filed, the Patent Office will not issue a patent for the same invention to any other person, without giving notice to the Caveator, who is then allowed three months time to file in an application for a patent. A Caveat, to be of any value, should contain a clear and concise description of the invention, so far as it has been completed, illustrated by drawings when the object admits. In order to file a Caveat the inventor needs only to send us a letter containing a sketch of the invention, with a description in his own words. Address MUNN & CO., 37 Park Row, N. Y.

Additions can be made to Caveats at any time. A Caveat runs one year, and can be renewed on payment of $10 a year for as long a period as desired.

Quick Applications.—When, from any reason, parties are desirous of applying for Patents or Caveats, in GREAT HASTE, without a moment's loss of time, they have only to write or telegraph us specially to that effect, and we will make special exertions for them. We can prepare and mail the necessary papers at less than an hour's notice, if required.

Foreign Patents.—American Inventors should bear in mind that, as a general rule, any invention that is valuable to the patentee in this country is worth equally as much in England and some other foreign countries. Five Patents—American, English, French, Belgian, and Prussian—will secure an inventor exclusive monopoly to his discovery among ONE HUNDRED AND THIRTY MILLIONS of the most intelligent people in the world. The facilities of business and steam communication are such that patents can be obtained abroad by our citizens almost as easily as at home. The majority of all patents taken out by Americans in foreign countries are obtained through the SCIENTIFIC AMERICAN PATENT AGENCY. A Circular containing further information and a Synopsis of the Patent Laws of various countries will be furnished on application to Messrs. MUNN & Co.

For Instructions concerning Foreign Patents, Reissues, Interferences, Hints on Selling Patents, Rules and Proceedings at the Patent Office, the Patent Laws, etc., see our Instruction Book. Sent free by mail on application. Those who receive more than one copy thereof will oblige by presenting them to their friends.

Address all communications to

MUNN & CO.,
No. 37 Park Row, New York City.
Office in Washington, Cor. F and 7th streets.

Patents are Granted for Seventeen Years, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application

PATENT CLAIMS.—Persons desiring the claim of any invention, patented within thirty years, can obtain a copy by addressing a note to this office, giving name of patentee and date of patent, when known, and inclosing $1 as a fee for copying. We can also furnish a sketch of any patented machine to accompany the claim, at a reasonable additional cost. Address MUNN & CO. Patent Solicitors, No. 37 Park Row, New York.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of their funds.

CITY SUBSCRIBERS.—The SCIENTIFIC AMERICAN will be delivered in every part of the city at $4 a year. Single copies for sale at all the News Stands in this city, Brooklyn, Jersey City, and Williamsburg, and by most of the News Dealers in the United States.

Advertisements.

A limited number of advertisements will be admitted in this page on the following terms:—Seventy-five cents a line, each insertion, for solid matter; one dollar a line for space occupied by engravings.

SIX MILLING MACHINES,
Of best Makers, for sale. Address ABM. BELL'S SON, 25 Park Row, N. Y. 1*os

BOILER, SAFE, & RAILING-MAKERS' TOOLS.—For price list of Power Punches, Rotary Shears, and Vertical Drills, address
16 3os] GREENLEAF & CO., Indianapolis, Ind.

SLATE SLABS,
Any size, shape, and thickness for sale by
HUDSON RIVER SLATE CO.
Samples, Plain and Marbleized, shown at their office, 16 4os] 25 Park Row, N. Y.

ONE ERICSSON CALORIC ENGINE—24-in. cylinder, 4 horse-power—for sale very cheap. This engine has been run but a few months and is as good as new. Also, one new 60 horse-power Trunk Beam Propeller Engine, with Boiler, Screw, and Shaft complete.
16 2os] GEO. H. SANBORN, 66 Sudbury st., Boston.

CIRCULAR SAWS.
N. W. SPAULDING & BROTHERS,
224 Washington street,
CHICAGO, ILL.

Manufacturers of Spaulding's Patent Adjustable-Tooth Circular Saws, adapted to sawing all kinds of timber. These teeth have been in successful use for the last eight years. They save saws, power, and time, making the safest, most durable, and economical saw in use.

☞ Particular attention paid to straightening and repairing large saws. All saws sold and work done warranted.

Send for descriptive pamphlet. 16 2os eow

READ! READ!!
THE
PRAIRIE FARMER
Is Published WEEKLY at
CHICAGO, ILLINOIS.

☞ The PRAIRIE FARMER is a Family and Fireside Journal, devoted to the interests of Agriculture, Horticulture, Markets, and the Household.

☞ The PRAIRIE FARMER will enter upon its TWENTY-EIGHTH year of publication, Jan. 1st, 1868.

☞ The PRAIRIE FARMER is the oldest and most widely circulated Rural Journal in the West.

☞ The PRAIRIE FARMER should be taken and read by every family in the land.

☞ The PRAIRIE FARMER is a weekly paper of sixteen large octavo pages, and is printed on fine white paper.

☞ The PRAIRIE FARMER is promptly mailed to its subscribers every week, thus keeping its readers fully posted upon the current matters of interest of Horticulture, Agriculture, and Markets, etc. etc.

☞ The PRAIRIE FARMER is edited with great ability, and it has a large corps of special, practical, and noted Contributors.

☞ The PRAIRIE FARMER is a weekly publication, and is furnished at the low price of Two Dollars per year.

☞ The PRAIRIE FARMER will be sent to the end of December, 1868, to NEW subscribers, who send in their names during the months of October, November, and December, marked "New," with Two Dollars, from the time the names are received.

☞ The PRAIRIE FARMER COMPANY will give liberal Premiums to all who get up clubs—large or small.

☞ Specimen copies sent to any address, free.

☞ For full particulars—Premium list, etc.,—Address,
PRAIRIE FARMER COMPANY.
16 1os] 164 Clark street, Chicago, Ill.

TURBINE WATER WHEELS.

The REYNOLDS PATENT embodies the progressive spirit of the age. Simplicity, Economy, Durability, Accessibility all combined. The only Turbine that excels Overshots. Awarded the Gold Medal by American Institute.

Shafting, Gearing and Pulleys furnished for all kinds of Mills, made on Mechanical Principles, under my personal supervision, having had long experience. Circulars sent free.

GEORGE TALLCOT,
4 13*—H—tf] No. 96 LIBERTY STREET, NEW YORK.

AGENTS WANTED—$10 to $20 a day, to introduce our new patent **Star Shuttle Sewing Machine.** Price $20. It uses two threads, and makes the genuine LOCK STITCH. All other low-priced machines make the Chain Stitch. Exclusive territory given. Send for circulars. W. G. WILSON & CO., Manufacturers, Cleveland, Ohio. 11 13os

GUN AND SEWING MACHINE Screws of all kinds and sizes on hand and made to order by the LAMB KNITTING MACHINE MF'G CO., Successors to the
7 13*os tf] Mass. Arms Co., Chicopee Falls, Mass.

EVERY MAN HIS OWN GRAINER.
ADAM'S AIR CYLINDER
GRAINING MACHINE

Gives PERFECT imitations of Oak, Walnut, Rosewood, etc., etc., and is adapted to the wants of House Painters, Furniture Manufacturers, Refrigerator Makers, Chair Manufactures, Coffin Makers, etc., etc. Does the best work, with the minimum of labor. Samples of its work may be seen on exhibition at the American Institute. For further particulars, see Scientific American, Aug. 3, 1867, and circulars, which may be had of the Proprietors and Manufacturers of the machine.

HEATH, SMITH & CO.,
282 Pearl street,
15 3os] New York.

CIRCULAR SAWS,

WITH
EMERSON'S PATENT MOVABLE TEETH.

These saws are now in use in every State in the Union. More than one thousand, of sizes from 8 inches to 72 inches in diameter, are in operation, sawing timber of all kinds, and cutting, in some cases, 30,000 feet of inch lumber per day. Also

EMERSON'S PATENT ADJUSTABLE SWAGE,

For Spreading, Sharpening, and Shaping the Teeth. Price $5. Manufactured by

AMERICAN SAW COMPANY,
Office No. 2 Jacob street near Ferry street, New York
Send for New Descriptive Pamphlet, and Price List. 15 tf

EUROPEAN AGENCY for the Exhibition and sale of American Patents and Manufactures.
BLANCHARD & McKEAN,
No. 3 Rue Scribe, Paris, France,
Will attend personally and promptly to all business relating to the interests of American Inventors and Manufacturers in Europe. Correspondence solicited.
GEO. A. BLANCHARD.] 13 tf*os [J. A. McKEAN.

THE LANE & BODLEY LATH MACHINE, iron frame, under-cutting saw, roller feed without gearing, apron for returning bolt, capacity limited only by the ability of the feeders. One boy can saw 50 lath per minute. Price, with
counter shaft and feed belts $300
Bolting saw, iron frame, with counter shaft 125
Improved cut-off saw, iron frame, belted 150
Jack for bundling lath 25
LANE & BODLEY,
Manuf. Circular Saw-mills and Wood-working Machinery
13 4os] Cincinnati, O.

DRAWING INSTRUMENTS
OF EVERY DESCRIPTION—
Swiss, German Silver, and French, separate and in cases—DRAWING BOARDS, DRAWING PAPER, WATER COLORS, TRANSITS, LEVELS, COMPASSES, etc. And all supplies for Engineers, Architects, or Machinists. A Priced and Illustrated Catalogue sent free on application.
WILLIAM T. McALLISTER,
14 12os] 728 Chestnut street, Philadelphia Pa.

WHEATON'S OINTMENT cures the Itch
WHEATON'S OINTMENT will cure Salt Rheum.
WHEATON'S OINTMENT cures Old Sores.
WHEATON'S OINTMENT cures all diseases of the Skin.
Price 50 cents;—by mail 60 cents. All Druggists sell it.
WEEKS & POTTER, Boston, Proprietors. [14 13*os tf-N

IMPORTANT TO SMOKERS.
THE Patent on the neat little device illustrated on page 120 of this volume of the Scientific American, for perforating cigars, is offered for sale on most reasonable terms. Every cigar store, or bar room, or boarding house should have one of the instruments. They are also adapted for individual smokers. The manufacture of them must be very profitable. For rights to manufacture, address OLIVER GUINAND, Patentee,
15 3*os] Vicksburg, Miss.

A RARE CHANCE.
FOR SALE—An Agricultural-Implement Manufactory, ten years established, with a first class reputation, in the best locality, for such business, in the United States. The Foundery, Machine Shop, Patterns, and Good Will will be sold at a bargain. For particulars, address Buffalo Agricultural Machine Works, Buffalo, N. Y. 15 3os

Zur Beachtung für deutsche Erfinder.

Nach dem neuen Patent-Gesetze der Vereinigten Staaten, können Deutsche, sowie Bürger aller Länder, mit einer einzigen Ausnahme, Patente zu denselben Bedingungen erlangen, wie Bürger der Ver. Staaten.

Erkundigungen über die, zur Erlangung von Patenten nöthigen Schritte, können in deutscher Sprache schriftlich an uns gerichtet werden und Erfinder, welche persönlich nach unserer Office kommen werden von Deutschen prompt bedient werden.

Die Patentgesetze der Vereinigten Staaten, nebst den Regeln und der Geschäftsordnung der Patentoffice, und Anleitungen für die Erfinder um sich Patente zu sichern, sind in Buch-Format von uns in deutscher Sprache herausgegeben, und werden gratis an alle verlangt, welche darum mündlich oder schriftlich einkommen.

Man adressire
MUNN & CO.
37 Park Row, New York.

The Scientific American,
4000 Book Pages a Year
THE BEST NEWSPAPER IN THE WORLD.

Published Twenty-Two Years.

This paper differs materially from other publications being an Illustrated weekly paper containing 16 large pages, devoted to the promulgation of information relating to the various Mechanical and Chemical Arts, Photography, Manufactures, Agriculture, Patents, Inventions, Engineering, Mill Work, etc.

Every number contains several beautiful engravings of new machines.

All the most valuable discoveries are delineated and described in its issues, so that, as respects inventions, it may be justly regarded as an Illustrated Repertory, where the Inventor may learn what has been done before him in the same field which he is exploring, and where he may bring to the world a knowledge of his own achievements.

The contributors to the SCIENTIFIC AMERICAN are among the most eminent scientific practical men of the times.

Mechanics, Inventors, Engineers, Chemists, Manufacturers, Agriculturists, and people in every walk of life, will find the SCIENTIFIC AMERICAN to be of great value in their respective callings. Its counsels and suggestions will save them hundreds of dollars annually, beside affording them a continual source of knowledge.

An official list of all Patents granted, together with the claims thereof, is published weekly.

The form of the SCIENTIFIC AMERICAN is adapted for binding and preservation; and the yearly numbers make two splendid volumes of nearly one thousand quarto pages.

Published Weekly, $3 a year, $1.50 half-year, 10 copies for 1 year, $25. Specimen copies sent gratis. Address

MUNN & CO.,
No. 37 Park Row, New York.

JUST PUBLISHED—THE INVENTOR'S AND MECHANIC'S GUIDE.—A new book upon Mechanics, Patents, and New Inventions. Containing the U. S. Patent Laws, Rules and directions for doing business at the Patent Office; 112 diagrams of the best mechanical movements, with descriptions; the Condensing Steam Engine, with engraving and description; How to Obtain Patents; Hints upon the Value of Patents; How to sell Patents; Forms for Assignments; Information upon the Rights of Inventors; Assignees and Joint Owners; U. S. Census by Counties, together with a great variety of useful information in regard to patents, new inventions and scientific subjects, with scientific tables, and many illustrations. 196 pages. This is a most valuable work. Price only 25 cents. Address MUNN & CO., 37 Park Row, New York.